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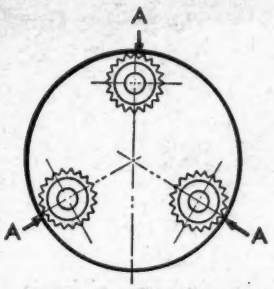

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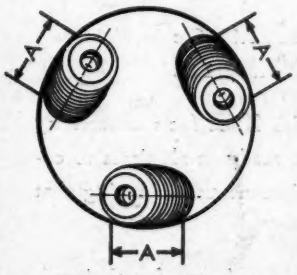

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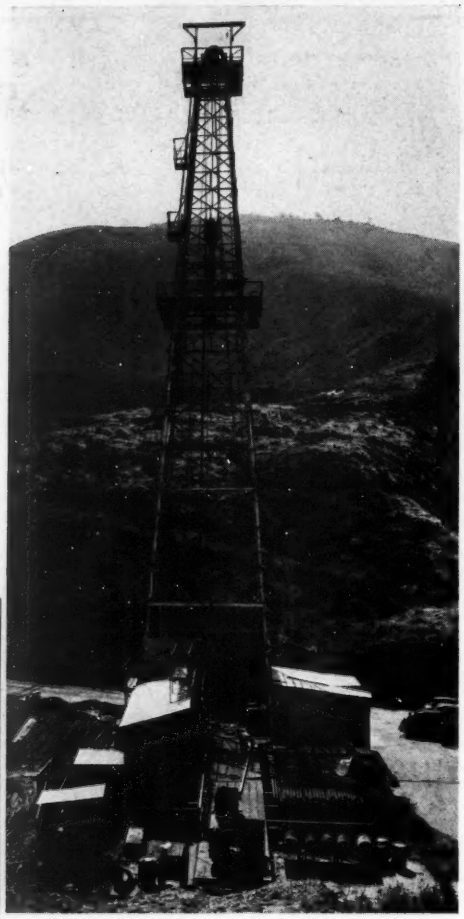

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CALIFORNIA
OIL WORLD
and Petroleum Industry

DECEMBER 10, 1936
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NUMBER 21
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THE WORLD'S FIRST OIL TRADE PUBLICATION

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Coming Events

Dec. 5-13—First International Consumers Petroleum Exposition, Convention Hall, Detroit, Mich.

Dec. 15—Mid-Continent Oil & Gas Assn., Annual Meeting of General Board of Directors, Tulsa.

Dec. 17—Southern California Meter Association, regular meeting, Van Matre Inn, 2563 Clarendon Ave., Huntington Park.

Dec. 18—Official date for annual Christmas Jinks of Calif. Oil & Gas Assn. Wildcat Committee. The place, Biltmore Hotel, L. A. The Wildcats promise better and funnier entertainment than ever, including an original play.

Jan. 11-15—American Road Builders' Assn., Highway Exhibit and Convention, New Orleans.

Jan. 11-15—Society of Automotive Engineers, Book-Cadillac Hotel, Detroit, Mich.

Jan. 12—Meeting of the Basin Chapter, A.P.I.

Jan. 12—Mining & Metallurgical Society of America, New York.

Jan. 16-24—First International Consumers Petroleum Exposition, Convention Hall, Detroit, Mich.

March 17-19—American Association of Petroleum Geologists, 22nd Annual Convention, Biltmore Hotel, Los Angeles.

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Los Angeles, California

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5 STOPS— *just driving Johnny and Mary to school*

4 out of every 5 miles you drive are "STOP-and-GO"

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No wonder you average over 30 stops a day . . . shift gears over 60 times a day . . . eating up gasoline every time you stop, shift or accelerate.

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SUPER SHELL

CALIFORNIA
OIL WORLD
and Petroleum Industry

IT MAY strike some of the readers of the California Oil World that these columns have been devoted almost too much to the matter of taxes on gasoline. Our only justification for continually harping upon the subject is that thus far, nothing has been done about it, and, for all any of us know, there may even be attempts to increase the taxes in the next session of the state legislature, or in Congress. We feel that, if we, along with all the other forces in the industry working for a reduction of taxes, continue the struggle, some day something may come of it. It is much as was the condition of the weather, about which Mark Twain said that people were always talking, but no one was doing anything. Well—we now have air conditioning as an accomplished fact, and we may some day get lower gasoline taxes, if people just keep talking about it.

The immediate subject in hand, however, was brought up by a publication issued by the State of California, entitled "Report of the State Board of Equalization, Motor Vehicle Fuel Distribution and Tax Schedule." This publication segregates the sales of gasoline among all distributors who sold any gasoline at all during any, or all, of the years from 1923 to 1935, inclusive. It also includes the amount of tax paid on that gasoline by the various companies that sold it.

It is an informative little book, but the biggest piece of information contained in it is simply that it requires an astronomically-trained mind to comprehend the figures it presents, both as to gallonage and as to taxes on that gallonage.

For example, during the thirteen years covered by the report, taxable gasoline sales totalled the incomprehensible sum of 14,370,762,596.8 (and carrying an 11-digit number into tenths is but an indication of the care with which the report was compiled) gallons. On this gallonage, $390,336,139.46 in taxes were assessed, or more than $30,000,000 per year. The report is not clear as to whether these taxes were assessed only, or whether this is the total collected, and, because of the different amounts of the tax at different times, it is impossible to determine what the figure actually means. In any event, taxes for recent years were pretty generally collected, simply because the oil industry made it a point to see that no one was permitted to sell gasoline without paying the tax. Incidentally, the oil industry not only collects this tax without cost to the state, but actually polices itself so that the state is assured that no member of the industry is holding out its tax money. That, we submit, is practically the apex of cooperation, and the reward to the industry is an ever-increasing threat of ever-increasing taxation on other branches of the industry's operations.

But to get back to the gasoline tax. Out of the $390,336,139.46, as of Dec. 31, 1935, plus the collections since that date, the state highway fund had a cash balance of $17,618,079.48 on Oct. 31, 1936. Which, at the rate of collections maintained thus far this year, represents about five months' gasoline taxes. This surplus exists in the face of the fact that highways are built and maintained at such a rate as to make the average citizen doubt whether he will ever be able to drive over the good roads furnished him. We do not say that there are too many good highways. We simply say that there are too many tax pennies collected from the oil industry—and the proof of that statement is that so much money is collected that not even politicians can spend it.

It is said that the gasoline tax is collected from the motoring public, which in a sense, is true. However, it is also very generally known that no industry can pass on all of a sales tax which represents such a big part of the cost of the item sold. There are, in California, four cents of taxes on every gallon of gasoline sold. These figures above quoted are for from two to three cents per gallon, the Federal tax not being included. If, as has been stated, the oil industry bears one cent of the cost of the gasoline tax, and the motoring public bears the other two cents, during 1935 the oil industry lost $14,021,668.26 on the taxes on gasoline sold that year. In other words, had the gasoline tax been cut one cent per gallon, the state still would have a surplus of $30,000,000 in the highway fund.

Another 14 million in earnings, distributed among the oil companies of the Pacific Coast would certainly not be amiss, and would not come to the stockholders of those companies as too great a blow to be borne. Those companies, especially since the Revenue Act of 1936 came into being, would most certainly be called upon to pay out most of that sum in the form of dividends, and those dividends would accrue to the benefit of the entire state, rather than to the benefit of highways.

If in addition to cutting the gasoline tax to two cents, the state were required to build highways out of asphaltic concrete, which can be demonstrated to be the best highway surface possible to obtain at any cost, and yet is much cheaper than cement concrete, the oil industry of the state would be in a fair way to make a reasonable profit on its tremendous capitalization.

It seems that there is a great deal for the oil industry to do before it can say that it occupies the favorable position it is entitled to occupy in the State of California. As one of the greatest contributors to the wealth of the state, California oil industry occupies an unenviable position as a Cinderella, with the advent of Prince Charming far away. The oil industry foots the bills, but the oil industry does not get any of the benefits derived from its taxes—even the gasoline tax money, levied upon an oil industry product, being lavishly spent to build wide highways of cement. That, to our way of thinking, is one of the biggest ironies that any industry can present.

Raise in Crude Prices Rumored; No Immediate Increase In Sight

EVEN THOUGH some independent refiners are paying bonuses as high as 30 cents per barrel for crude on Signal Hill, and even though the demand for oil has been high enough to warrant the Central Committee's move of increasing the allowable 7000 bbls. per day, there still seem to be no immediate prospects for crude oil price raises.

The rumor that prices would be raised probably got its start with the raises in price announced for the Mid-Continent, to be effective at the first of the year. However, with the raises as contemplated, the Mid-Continent price still remains on a comparable basis with prices in California, the Mid-Continent price having been considerably lower than California prices for some time past.

The California industry has not been succeeding in withdrawing oil from storage to any great extent, a slight addition having been made to storage during October, with another expected for November. These additions have been slight, but the mere fact that oil is being added to storage is an indication that there will be serious consideration given to the situation before the large marketing companies increase present prices.

Gasoline Prices

A further fact militating against an increase in prices would be the necessity, under a higher crude price schedule, for raising the price of gasoline. This move, if made, and it will have to be made if crude prices are raised, is apt to boomerang against the industry, particularly since gasoline demand is almost sure to go down during the coming winter months, and will remain at comparatively low levels until spring.

The gasoline market at present is fairly stable, the recent weakness having been overcome by the action of the Retail Petroleum Dealers Association in threatening suits against dealers who posted prices of 12.9 cents per gallon. These prices, according to the association, did not permit the station to operate except at a loss, and the California Fair Trade Practices Act, held valid by the Supreme Court, prohibits the selling of an article at a loss. The association was prepared to prove that the lowest possible profitable price for the gasoline dealer was 13.9 cents, and this price has become the minimum.

Knowing that the gasoline market is fairly stable, and knowing that an increase in crude prices would necessitate an increase in gasoline prices, it is doubtful if the purchasing companies will look with favor upon an increase in crude prices. The gasoline market, in the final analysis, governs the price of crude—unless and until there is an actual crude shortage, which certainly doesn't exist at present—and neither the time of year nor the condition of the market justifies an increase in gasoline prices right now.

Favorable Reaction

The increase in crude prices in the Mid-Continent may react favorably on the California industry in one way, once the new Mid-Continent prices are actually in effect. The raise will not permit profitable shipments of California products to the east coast, but it may be sufficient to stop shipments of Texas gasoline to California and the Pacific coast. A few shipments have been made from Texas during the past year, but with a new price schedule in effect in that area, the transportation cost may prevent further shipments.

If that turns out to be the case, the Pacific coast gasoline market may be so strengthened that, with the beginning of the high consumptive demand of the spring and summer months, an increase in gasoline prices may be possible, thus making an increase in crude prices possible.

The general opinion is that, while bonuses, greater allowables, and the present stability of the market are favorable to a crude price raise, the unfavorable elements of additions to storage, low consumer demand during the winter months, a disinclination to disturb the gasoline market, and plenty of crude on hand at the moment, will probably stop a price raise until spring, at least, although it must be admitted that these conditions could change rapidly enough to warrant a price raise before that time.

When some of the lads of Shell's production, marketing and refining departments get together there is usually a good time of renewing old acquaintances, having a big time barbeque and competing in a Golf Tournament. Recently over 100 Shell men from Ventura, Long Beach, Wilmington-Dominguez, Los Angeles, Santa Maria, Oilfields, and Bakersfield, got together at the Ojai Country Club. Useful prizes were won by different teams, but the big Gold cup was won by the Wilmington Refinery Team, which made the low score of 535 for the tough Ojai Course.

Picture shows: A. J. Forbes, Don Anderson, P. Radcliffe, R. A. Ellis, Warren Gage, J. L. Arthur, Bill Phelps, A. H. Harrell, I. N. Kuckenbaker, A. Pollock, R. O. Guder, T. Herman, V. Wilson, W. A. Young, R. Millberry, Bud Griffin, John Roberts, W. F. Bates, A. R. Harris, Earl Arnbruster, and R. S. Schmeider.

Secretary Ickes Not Retreating On Regulations For Issuance Of Permits

LETTERS just received from the Commissioner of the General Land Office make it plain that Secretary Ickes will not retreat an inch from the stand he took in drawing up the regulations under which leases may not be surrendered without the express consent of the Secretary in writing. The letters were addressed to the attorneys for protesting holders of permits who must exchange the same for leases within a prescribed period.

Holding the rule impossible to accept, the leases are being returned to the General Land Office upon the advice of attorneys as soon as received. This procedure is being followed generally in California, according to advices from sources in touch with the situation, and it is understood that the same practice prevails in the Rocky Mountain states. Evidently the Secretary takes the view that leases are to be given only when the recipients are fully prepared to drill within what is officially held to be a proper period of time, and that drilling is to be made an inescapable obligation except in such cases, if any, in which the Secretary may see fit to make an exception as a matter of expediency. The Commissioner of the General Land Office in his correspondence makes it quite clear that failure to drill will lead to forfeiture of bonds.

Very seldom do oil companies make contracts with land owners which forbid them to surrender a lease without drilling. In practice they take and surrender, undrilled, tens of thousands of acres every year.

■ ■ ■

Meter Association Meets

The next meeting of the Southern California Meter Association will be held Dec. 17 at the Van Matre Inn, 2563 Clarendon Ave., Huntington Park, according to Guy Corfield, president.

Dinner will begin at 6:00 o'clock and the regular business meeting will open at 8:00. Entertainment will be furnished by the Crosby Gauge Co. Bob Angell, chairman of the program committee, announced that Fred C. Hough, distribution engineer for Southern Counties Gas Co. will read a paper entitled: "Proper Installation and Maintenance of Relief Valves."

Operators Seek Refund

Four oil companies that drilled slant wells at Huntington Beach have asked the state to refund $42,000 which they have paid in royalties for tideland oil. They have found that their wells failed to reach out far enough to reach the state's lands and are bottomed under the Standard Oil's Pacific Electric lease, so they have had to pay the Standard for the oil they have inadvertently taken. Before this discovery was made they paid the state royalties which they ask be returned.

The four companies are the Elyod Oil Co., Reichrow Corp., Vicaroo Oil Co., and Hammil Oil Co.

■ ■ ■

Shell Well Taken Over

C. G. Willis has taken over the Shell Flood Control No. 1, Long Beach, and he and his associates are planning to deepen the well.

Unions Enter Complaint Against Shell Labor Plan

A HEARING before the National Labor Relations Board in Los Angeles was scheduled for Dec. 10 on complaints made by the Oil Workers Association and four affiliated unions on asserted violations of the Wagner labor law by the Shell Oil Co.

The Oil Workers, Blacksmiths, Boilermakers, Electricians and Machinists charge the Shell Co. of forming a company union without submitting the plan to a vote of their employees, and of refusing to accept the above unions as the official bargaining representatives of the employees.

Following a vote of the employees taken in 1934 under the auspices of the Labor Policy Board, in which the five unions were certified as the official bargaining agency of the employees, Shell agreed to recognize the unons as such an agency for two years. With the expiration of this agreement on June 30, 1936, the labor unions claim that Shell attempted to restore the company union and refused to accept the regular labor unions as the official representatives of its employees.

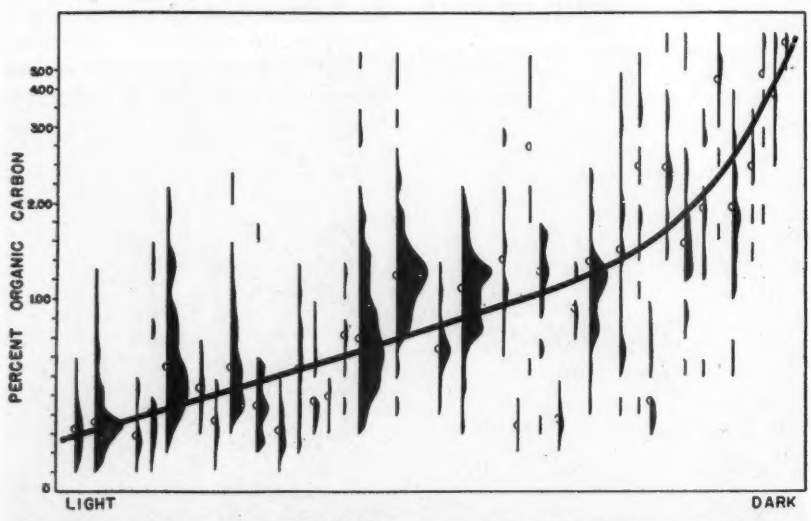
New office building of the O. C. Field Gasoline Corp. Built in the shape of a U, with a wall enclosing the open side of the U, the offices open onto an attractive court. Located on Wilshire a block west of Figueroa, the building contains offices for both the O. C. Field Gasoline Corp. and the Casmite Co., a subsidiary concern engaged in the marketing of asphalt products.

Means of Recognizing Source Beds

By Parker D. Trask and H. Whitman Patnode (Part Two)

THE COLOR of the sediments was found to vary more or less directly with the organic content (Fig. 4). Light sediments, in general, contain little organic matter and dark sediments ordinarily contain much. The samples were arranged according to the 37 colors in order of increasing intensity. All the samples for each color were then plotted in 37 individual graphs according to the carbon content of the samples. On these individual graphs the ordinates represent the carbon content, and the abscissas the relative frequency as, so that proper consideration could be given to the number of samples for the individual colors. The larger the size of the black areas on each graph, the greater is the number of samples for that particular color. The carbon content is plotted on a scale that roughly approximates a logarithmic scale; because, if the coloration is due largely to the organic constituents, the proportionate increases in organic content with respect to increases in color are more pertinent than are the actual increases in organic content. For example, an increase in organic the first is 10 times that of the second. Consequently, samples whose organic content increases from 0.4 to 0.5 should exhibit a greater change in color than those whose organic content increased from 4.0 to 4.1.

FIG. 4
Relation of Color to Carbon Content of Sediments



The black areas show the variation in carbon content of each of 37 different color classes of sediment, arranged in order of increasing darkness. In these individual black areas, the ordinates represent percentage of carbon in the sediments; the abscissas indicate the relative frequency of sediments of given organic content for the particular color represented by the black area. For example, for the color represented by the second black area from the left, a large part of the sediments has a carbon content of about 0.3 per cent, but the total range in carbon is from 0.1 to 1.2 per cent. The half circles indicate averages (medians) of the carbon content of the individual color groups. The heavy black line shows the general trend that is indicated by the averages.

of samples of given carbon content. Thus, for example, in the second graph from the left side of the figure the most common quantity of organic matter for sediments of that particular color is 0.3 per cent, and the range in carbon content is from 0.1 to 1.2 per cent. Several different scales were used for the abscissa-content from 0.4 to 0.5 per cent represents an increase of ¼, or 25 per cent in the quantity of organic matter; whereas an increase of 4.0 to 4.1 per cent represents an increase of 1/40, or 2.5 per cent. The increase in percentage of organic matter is the same in the two pairs of samples, but the relative increase of

The averages for the individual graphs are indicated by circles, and the black line represents roughly the general increase in organic content with increase in color. This increase is very definite and distinctive, and there seems little doubt that organic content does become greater as the sediments get darker. However, the quantity of organic matter varies considerably for individual colors. Some of the dark sediments contain relatively little organic matter, and some of the light ones contain relatively much. Sediments colored red and yellow with iron oxide contain less organic matter than other sediments that have colors of the same intensity. The three medians in the lower right corner represent sediments of this type. Evidently, part of the dark coloration is due to the presence of iron compounds.

Volatility

As petroleum is rich in volatile substances, it possibly is derived to a considerable extent from sediments that are rich in volatile organic substances. The data presented in Fig. 5 support this concept.

FIG. 5
Relation of Volatility to Productivity

VOLATILITY					
AREAS	PRODUCTIVE	QUESTIONABLE	BARREN	$M_P - M_B$	$\frac{D}{\sigma_{M_P - M_B}}$
CALIFORNIA	5.0	5.0	2.2	3.4 ± .39	8.7
ROCKY MOUNTAINS	4.4	3.4	3.4	1.0 ± .45	2.2
MID-CONTINENT	.41	.18	.105	.36 ± .12	3.0
EAST TEXAS	.148	.149	.133	.15 ± .10	1.5
GULF COAST	.40	.84	.60	.20 ± .11	1.8

Numbers above blocks indicate average assay numbers.

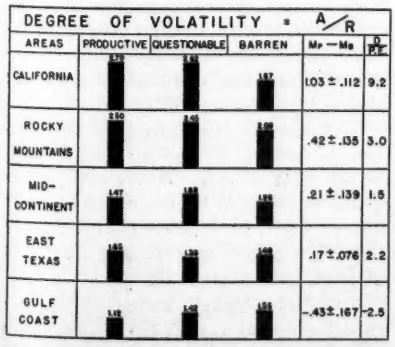
The volatility of the "productive" beds is greater than that for the "barren" beds in each of the five areas studied. The quotient of the difference divided by the probable error ranges from 1.5 in the East Texas area to 8.7 in California. As this quotient is positive for each area and has an average (median) of 3.0, it seems fairly evident that the average volatility of "productive" beds is greater than that for "barren." The actual magnitude of the volatility as indicated by the assay number, however, is different in different areas. In California and the Rocky Mountains the average for all sediments, both "productive" and "barren," is about 4; in the Mid Continent and the East Texas Basin it is about 1.4; and in the Gulf Coast it is about 0.75. Unless the general volatility of the sediments in a region is known, difficulty might be experienced in trying to use the volatility as an index of source sediments. The volatility as expressed by the assay number, however, offers possibilities in the recognition of source beds, and should receive further attention.

Degree of Volatility

The volatility is a measure of the quantity of volatile organic substances in a given sample. The degree of volatility is a measure of the extent to which the organic substances are volatile. The organic constituents of samples that have high degrees of volatility are rich in volatile substances, and those that have low degrees of volatility are poor in volatile substances. The degree of volatility is independent of the quantity of organic matter.

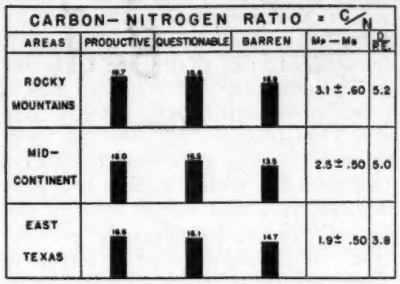
The data presented in Fig. 6 indicate that the average degree of volatility of "productive" beds is in

FIG. 6
Relation of Degree of Volatility to Productivity



The degree of volatility, A/R, is the ratio of the assay number, A, to the reducing power, R. Numbers above blocks represent average degree of volatility.

FIG. 7
Relation of Carbon-Nitrogen Ratio, C/N, to Productivity



Numbers above blocks represent average carbon-nitrogen ratios.

general greater than that of "barren" beds. The quotient of the difference and probable error is greater than 1.5 in all areas except the Gulf Coast, where it is —2.5. This negative quotient for the Gulf Coast sediments, as discussed above, need not necessarily be considered as damaging to the general relation for the degree of volatility, as the sediments from this area contain so little organic matter that it is impossible to get reliable determinations of many of the assay numbers.

The average degree of volatility varies less among the different areas than does the volatility. It is mainly between 1 and 2 in the Mid Continent, East Texas Basin, and the Gulf Coast; and mostly between 2 and 3 for the Rocky Mountain area and California. Despite the apparent unfavorable relationship for the Gulf Coast, the degree of volatility seems more likely to prove useful in the recognition of source beds than does the volatility.

Carbon-Nitrogen Ratio

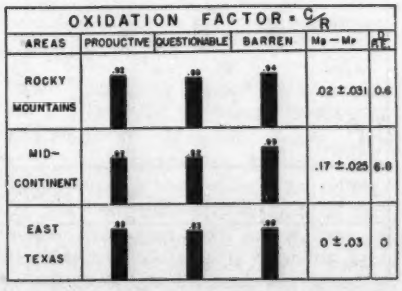
The ratio of carbon to nitrogen is distinctly higher for the "productive" beds than for the "barren" (Fig. 7) in each of three areas in which it has been studied—Rocky Mountain, Mid Continent, and East Texas Basin. The quotient of the difference and probable error ranges between 3.8 and 5.2 for these three areas. The general magnitude of the ratio differs in different areas. It is about 18 in the Rocky Mountain area, 16 in the Mid Continent and East Texas areas, and 14 in the California area. Consequently, if this ratio is to be used as a means of identifying source beds, an estimate of the general average value for the individual area under consideration would first have to be obtained. Like the other characteristics studied, it varies considerably from the average; and some "productive" beds have low ratios, and some "barren" beds have high ratios. The "productive" beds, however, more commonly have high ratios than do the "barren" beds. The carbon-nitrogen ratio has not yet been studied in California and the Gulf Coast, but it seems sufficiently promising to be investigated further.

Oxidation Factor

The oxidation factor is an inverse measure of the degree of reduction. In a previous paper[16] about sediments from Colorado and Wyoming, beds that had low degrees of oxidation were observed to be commonly associated with oil zones, although a considerable number of barren beds were found also to have low oxidation factors. Many more carbon determinations of sediments from the Rocky Mountain area have been made since the publication of that paper. The results of these more recent data suggest that the oxidation factors for the "productive" beds in this area do not differ greatly from those for "barren" beds (Fig. 8).

Similarly, in the East Texas Basin, the oxidation factors of the "productive" and "barren" beds are essentially the same. In the Mid Continent, however, the "productive" beds have a distinctly lower oxidation factor than the "barren" strata, where the average for the "productive" sediments is 0.82 compared with 0.99 for the "barren," and the quotient of the difference and probable error is 6.8. As data for the Gulf Coast and California are not yet available, it seems premature to pass judgment on the reliability of the oxidation factor as a means of recognizing mother rocks of petroleum; but, at present, it does not appear to be an especially useful in-

FIG. 8
Relation of Oxidation Factor to Productivity



The oxidation factor, C/R, is the ratio of the carbon content, C, to the reducing power, R. Numbers above blocks indicate average oxidation factors.

dex of source beds. However, other data relating to the state of oxidation seem to indicate that the state of oxidation is related to the generation of petroleum. Consequently, the oxidation factor should be studied further.

Nitrogen-Reduction Ratio

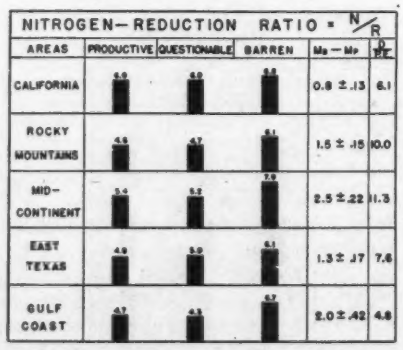
The nitrogen-reduction ratio is the most reliable guide for the identification of source beds that has been found. In each of the five petroliferous provinces it is distinctly lower for the "productive" beds than for the "barren" (Fig. 9). The quotient of the difference and probable error ranges from 4.8 for the Gulf Coast to 11.3 for the Mid Continent. The nitrogen-reduction ratio differs in magnitude in the different areas, owing in part to the varying content of nitrogen in the organic matter. The ratio is low in Wyoming, where the sediments have a low nitrogen content, as is indicated by the generally high carbon- nitrogen ratio; and it is high in California, where the sediments are relatively rich in nitrogen. Consequently, in using the nitrogen-reduction ratio as a means of recognizing source beds, it would be advisable to make enough carbon-nitrogen determinations to ascertain the order of magnitude of the nitrogen content of the organic matter.

The distinction between the "productive" and "barren" beds is illustrated in another way in Fig. 10. This figure shows for each petroliferous province the percentages of the total number of lithologic units for each of the three grades of productivity in which the average carbon-nitrogen ratio is greater than 6.5 or less than 4.5. In this figure the heights of the black blocks represent the percentages indicated by the numbers above the blocks. The number "32" for the "productive" beds for the California sediments in which N/R is greater than 6.5 indicates that, of all the lithologic units from California that were classified as "productive," 32 per cent had a nitrogen-reduction ratio greater than 6.5. The number "10" for the "productive" beds for the California sediments in which N/R is less than 4.5 indicates that 10 per cent of the beds that were classified as "productive" in California had a nitrogen-reduction ratio of 4.5. Thus 32+10, or 42 per cent of the lithologic units from California had ratios of less than 4.5 or greater than 6.5; and the remainder, 58 per cent, had ratios between 4.5 and 6.5. Similarly, 68 per cent of the "barren" units from California had ratios greater than 6.5; none of the "barren" units had ratios less than 4.5; and the remainder, 32 per cent, had ratios ranging between 4.5 and 6.5. For the Rocky Mountain area 8 per cent of the "productive" units had ratios greater than 6.5; 39 per cent, less than 4.5; and 53 per cent, between 4.5 and 6.5. The "barren" units from this area had 32 per cent greater than 6:5; 13 per cent, less than 4.5; and 55 per cent, between 4.5 and 6.5. This chart shows clearly that the "barren" sediments are more likely to have ratios greater than 6.5 than are the "productive" sediments, and that the "productive" sediments are more likely to have ratios less than 4.5 than are the "barren" beds.

The "barren" and "productive" beds, however, overlap—especially for ratios between 4.5 and 6.5; but relatively few "barren" beds have ratios less than 4.5, and relatively few "productive" beds have ratios greater than 6.5. The percentage of "productive" beds greater than 6.5, however, is relatively high for California and the Mid-Continent—where 32 and 24 per cent, respectively, exceed 6.5; but the percentage for these areas drops rapidly between 6.5 and 7.0, as less than 15 per cent of the ratios for the productive zones for these two areas are greater than 7.0.

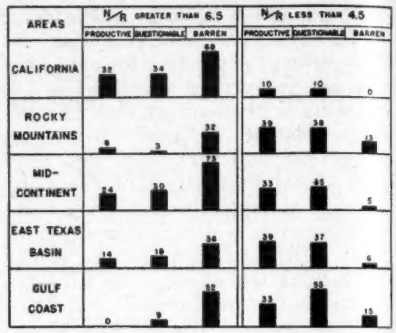
The nitrogen-reduction ratio seems to be a particularly satisfactory index of source beds compared with the other characteristics studied, because it combines two indices that apparently are related to source beds: one, the degree of reduction, and the other, the carbon-nitrogen ratio. A large number of determinations have been made which show consistent and decidedly definite differences for each of five petroliferous provinces. It seems evident, therefore, that the nitrogen-reduction ratio warrants the attention of geologists in their search for oil.

FIG. 9
Relation of Nitrogen-Reduction Ratio to Productivity



The nitrogen-reduction ratio, N/R, is the ratio of the nitrogen content, N, to the reducing power, R. Numbers above blocks indicate average nitrogen-reduction ratios.

FIG. 10
Relation of Productivity of Sediments to High and to Low Nitrogen-Reduction Ratios



On the left side of figure numbers above blocks indicate the percentage of lithologic units that have an average nitrogen-reduction ratio (N/R) greater than 6.5; on the right side, the numbers refer to percentage of units that have an average ratio less than 4.5. The percentages represent individual classes of productivity for the individual areas. Thus, the two numbers for the "productive" units from California—32 on the left and 10 on the right—indicate, respectively, that 32 per cent of the lithologic units from California that were classified as productive had a nitrogen-reduction ratio of more than 6.5, and 10 per cent had a ratio of less than 4.5. The remainder of the "productive" units from California, viz., 100 — (32 + 10) or 58 per cent, had ratios between 4.5 and 6.5.

CONCLUSIONS

Eight characteristics of sediments have been studied with respect to their effectiveness as means of recognizing source beds. The results of these studies are summarized in Table 3. The data upon which this table is based are so numerous, and their distribution is so widespread, that the relative rankings indicated in the table presumably are fairly reliable. The relationships for the exidation factor, carbon-nitrogen ratio, and color are less firmly established than the others, as they are based on fewer analyses.

The organic content is a poor index of source beds—although sediments that contain very little organic matter have a tendency to be poor source beds, and those that are very rich in organic matter are likely to be favorable source beds.

Color is a rough index of the organic content and, therefore, presumably is also a poor means of recognizing source beds.

The oxidation factor, apparently, is not a particular useful index of

source beds, except in the Mid Continent area. The oxidation factor, however, has not yet been investigated adequately; and, when it has been studied further, it may prove more useful than is now apparent.

The reducing power shows a slight relationship: the greater the reducing power, the more likely the sediment is to be a source bed. This relationship, however, is characterized by so many exceptions that its usefulness as a practical means of recognizing source beds is questionable.

TABLE 3

Characteristics of Sediments for Recognizing Source Beds

Characteristic	Relative Degree of Effectiveness as an Index of Source Beds
Organic content	Poor
Color	Poor
Oxidation factor	Poor
Reducing power	Slight
Carbon-nitrogen ratio	Fair
Volatility	Fair
Degree of volatility	Fairly good
Nitrogen-reduction ratio	Very good

The carbon-nitrogen ratio has not yet been investigated as thoroughly as some of the other characteristics, but the available data indicate that high carbon-nitrogen ratios are more commonly associated with "productive" beds than with "barren" beds. As the carbon-nitrogen ratio differs in different petroliferous provinces, and also within the individual provinces, many low ratios are associated with "productive" strata, and many high ratios are associated with "barren" strata—although the averages for the "productive" and "barren" beds for individual provinces seem distinctive. The usefulness of the carbon-nitrogen ratio, therefore, is equicoval—although it may be found helpful in some areas. This ratio warrants additional study.

The volatility of the sediments within the individual petroliferous provinces seems to be a fairly good index of source beds. The volatility, however, differs so much from province to province that, in order to use it as an index, the general volatility of the sediments that are being considered will have to be known. The volatility, accordingly, is not regarded as being so promising as some of the other characteristics which do not vary so widely from area to area. It, nevertheless, offers possibilities of being useful, and should be investigated further.

The degree of volatility does not vary so much from province to province as does the volatility, and probably is a more useful index of source beds. The "productive" sediments more commonly have high degrees of volatility than the "barren," and the "barren" beds more commonly have low degrees of volatility. Some beds, however, that have a low degree of volatility seem to be good source beds, and some that have a high degree seem to be poor source beds; but the proportion of such beds is not large. The degree of volatility, therefore, merits consideration as a means of recognizing source beds. More work should be done upon it in order to ascertain the reliability with which this characteristic may be applied.

The nitrogen-reduction ratio appears to have very good possibilities as a means of recognizing source beds. Relatively few beds in which the ratio is less than 4.5 seem to be poor source beds, and comparatively few beds in which the ratio is greater than 7.0 seem to be favorable source beds. The average for beds associated with oil zones is definitely greater than the average for those associated with "barren" zones in each of the five regions studied. Areas such as California, in which the organic content of the sediments is relatively rich in nitrogen, have higher nitrogen-reduction ratios than those in which the nitrogen content is low. Therefore, in using the nitrogen-reduction ratio, it would be advantageous to determine enough carbon-nitrogen ratios to ascertain the general nitrogen content of the sediments. The nitrogen-reduction ratio is comparatively simple to determine, and the reliability of individual determinations is high. This ratio, therefore, can be recommended for very serious consideration as a means of recognizing source beds.

This investigation of source beds is at present in a more promising state than at any time in its history. In spite of many factors that might be expected to lead to the derivation of anomalous conclusions, four characteristics should now be made in selected areas in order to ascertain how effectively they can be used for ascertaining whether or not individual layers are source beds. One of them, the nitrogen-reduction ratio, seems particularly promising; and the prospects seem good that it will prove to be of economic advantage to the petroleum industry.

ACKNOWLEDGEMENTS

This article represents joint work of the authors. Trask wrote the paper and supervised the work. Patnode made most of the calculations and compilations. The chemical anaylses were by H. E. Hammar, J. L. Stimson, R. W. Gillespie, R. V. Hughes, W. Ross Keyte, and G. D. Johnson—all of whom have been associated with the American Petroleum Institute project on source beds. The laboratory headquarters for this work was in the Division of Chemistry, National Bureau of Standards, Washington, D. C. A small number of the chemical analyses was made in the Engineering Department of Tulsa University, Tulsa, Okla.

The samples for the work were obtained through the kindness of a large number of oil companies and company officials. Numerous geologists gave information on the correlation of the well samples. This cooperation is greatly appreciated by those connected with this investigation of source beds.

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Glenn M. Ruby, consulting geologist, left Los Angeles by plane Tuesday of last week for Houston, Texas. Mr. Ruby has spent the last five months in West Texas in connection with geological work on certain properties in that region, and spent only a few days in Los Angeles. While he is returning here for the Christmas holidays, Mr. Ruby is contemplating the removal of his residence and offices to Texas in the near future.

Necessity Of Depletion Allowance For Producing Companies

By Wesley E. Disney
Member, Ways and Means Committee

THE TAX COLLECTOR is not as popular as Santa Claus, but he ought to be. Civilization is built upon taxes. Fundamentally, without taxes we would have no organized society. Taxes are the contributions which we make to the activities which we undertake in common, for the general welfare. Whenever a Chamber of Commerce shows a visitor about the city, he points out the things which have been done out of the tax returns.

The difference between modern civilization and ancient civilization lies in its concept of the tax problem. In the days of old, taxes were tribute paid to some master. In old Rome, tax farmers paid a lump sum to the state, then collected all they could from the people. There was no fixed levy. The only rate was "all the traffic will bear." In the middle ages, robber barons, with their castles perched above some mountain pass, made every traveling merchant pay toll. They took what they wanted as their levy upon what might be termed interstate commerce. We have changed all that. Modern civilization assesses persons and corporations upon bases which are supposed to be equitable. The proceeds of those taxes provide for national defense, for the general welfare, for the services rendered by such socialized agencies as post offices, highways, police, firemen, libraries, schools, etc.

Right To Tax

The right to tax was one of the most zealously guarded ones in the formative years of this republic. Each state was zealous of the taxable values within its own borders, and hesitated long before it gave to the national government any taxation privileges. Ultimately a clause was written in our Constitution requiring uniformity of taxes levied among the states. It required the adoption of a special amendment in order that taxes which might not be uniform could be levied upon incomes.

Behind all the taxes which have been levied in this country, whether by Congress or by other bodies having the tax power, there has always been two ideas: First, that these taxes must be equitably levied; second, that these taxes should be for the common defence, or the general welfare.

Without the power to tax, there can be no government and no organized society. The manner in which that power is exercised tells more about a system of government than pages of other detail. Possibly no better illustration could be had of the desire of Congress to deal justly and equitably in taxation matters than is displayed in the depletion allowances, which are for the wasting mineral industries. At the same time, those allowances are one of the striking evidences that this industry differs from almost every other type of industry in nearly every important aspect.

First Deductions

The first depletion deductions which were written into law were adopted on February 24, 1919, in the so-called Revenue Act of 1918. These allowances were commonly called "discovery provisions." They were carried in the Revenue Acts of 1921 and of 1924. A very complicated system was intended to assure to the discoverer of a new property certain returns on his investment by making these deductible from his income. The machinery to apply this discovery deduction was so costly and so complicated and so slow that Congress, in 1926, adopted a percentage system which has since been followed, allowing 27½% of the gross income and limited to 50% of the net income. This theory has been continued in the Revenue Acts of 1928, 1932, and is in the current Tax Bill.

This depletion was not granted by Congress as any special privilege. It was not a subsidy. It is, rather, a striking evidence of the desire of the Congress of the United States to make sure that the taxes it levies are fair and equitable. It recognizes the fact that each barrel of oil which is sold represents the disposal of a part of the capital of the owner of that well. Receipts from production are not like the receipts of a manufacturing institution. The original capital invested in a factory may have been expended for buildings, machinery and equipment, which are used in production. The product, when sold, does not represent a portion of that capital. The buildings and the equipment may decrease in value. That is obsolescence and is cared for by Congress in a special provision for obsolescence or depreciation. The oil industry also has that obsolescence allowance in refining, but when the oil industry, unlike the shoe factory, sells its crude oil, it is depleting its own capital, and the receipts from that oil cannot all be accurately classified as income,

The shoe manufacturer pays taxes upon his net income. The only way the oil producer can arrive at his true net income is to estimate what portion of his actual capital which is tied up in the oil beneath the ground, is included in the price he receives for the oil which he sells.

Principle Recognized

Congress as a whole has recognized this principle. There have always been those in Congress, however, who have not understood this fairly simple theory. In discussions over the propriety of these depletion allowances, it has sometimes been suggested that these may in time amount to over 100% of the actual capital investment. It is true that this might sometimes happen. Such cases are rare, however. Actually, many never get back the full amount they have invested. The classic illustration of the 20 oil wells drilled by the present governor of this state is a case in point. It has been told on the floor of Congress that Mr. Marland, as he was then, drilled 19 wells continuously. Each of them was dry. The twentieth well was a producer. In order to get that twentieth well he had to invest the costs of

drilling the 19 dry wells. Whether he might receive from the twentieth well sufficient money to pay for the previous 19 constituted one of those hazards which make the oil industry so interesting.

Because of hazards like these, and others, Congress has endeavored to protect the welfare of the industries involved and aid them in carrying a burden which, without deductions such as those in the depletion allowances, would make it impossible.

Experts Create Difficulties

Curiously enough, many of the difficulties in the application of depletion allowances have been created by the experts on taxation matters. They have misunderstood the issue. In 1933, the Acting Secretary of the Treasury, in a statement to the Ways and Means Committee of the House of Representatives, recommended the entire elimination of the depletion allowances which were in the bill under discussion at that time. He held that percentage rates did not accurately represent the true amount of depletion of the oil reserves concerned. He was not aware of the fact that any estimate of oil reserves beneath the ground must be approximate. Neither did he seem to be aware of the fact that the production rate of any given well might suddenly decline until it was only a fraction of what it had previously been. In brief, he thought that the petroleum industry was like any other industry, able to accurately survey all its assets, list them in a balance sheet, and deduct from the gross income that proportion of capital assets which had been expended in the production of that income.

Congress, seeking full information from those best informed—members of the oil industry, did not accept the position taken by the tax experts, but continued the depletion allowances which were so necessary as well as just.

This double difficulty has frequently threatened the continuation of these taxes. Congressmen who are from states which do not produce oil, think the oil industry is being granted improper favors. Officials who are experts on general taxation questions do not understand the peculiar nature of the petroleum industry. Because of these two facts, it is of the first importance that the petroleum industry shall give to Members of Congress the fullest and most detailed information on these questions, so that they may act intelligently and fairly. I assure you that that is their purpose and

Civilization depends upon taxes, but taxes must be based upon an equitable foundation. Paper presented at the annual meeting of the I. P. A.

their wish. If they make mistakes, it will not be because of intent. It will be because they have not had available reliable data which only the petroleum industry itself can supply.

Interpretation Dangers

Quite recently it appeared to me that it was possible that these depletion allowances might be endangered by mistaken interpretations by the Revenue Bureau. When the 1936 Tax Bill was before the Ways and Means Committee, of which I am a member, Commissioner Helvering of the Internal Revenue Bureau was testifying. The question of these allowances came up. I inquired of the Commissioner whether any change in the method of reckoning these allowances was being considered. He replied in the negative. In order to make assurance doubly sure, I repeated my inquiry in different language, so that there appears today in the record of that hearing, the plainest and most unequivocal statement by the Commissioner that the manner of dealing with these depletion allowances is not to be changed. I was able to do this because I knew the problems of the petroleum industry, and I was not certain that the Bureau of Internal Revenue had the same degree of familiarity.

If Congress does not always meet the issues concerning your industry in quite the way which you believe it should, I trust that you will remember that Congress is not so well informed as yourselves concerning the many ways in which your industry is unique. Most of the ordinary theories are reversed in the petroleum industry. The tariff is commonly assumed to be an instrument by which a monopoly may be built up in this country. There are scores of instances which illustrate that fact. In the petroleum industry this is reversed. A tariff on petroleum products is the best insurance against the development of a monopoly, since those agencies which import petroleum might, by increasing their imports, so ruin the domestic producer that they could purchase his properties and monopolize the entire market.

Price standardization is usually considered the instrument of monopoly in most other phases of our industrial life. In your industry it is an insurance against price wars and the ruin of the independent, who furnishes the competitive element.

Restricted production is commonly viewed as a restraint of trade, which tends toward monopoly. It may be true in most other industries. It is not true in yours. Only by holding your supply to the limits of consumptive demand can you protect the competing elements and the consumer alike, and thus avoid monopolistic practices.

Conservation Questions

Conservation of our natural resources in general is assumed to be promoted by their reservation. If we do not use some of these natural resources, but substitute some imported products, it has been held that this is a wise policy. It may be true of others, but it is not true of your industry. During the past year your discoveries of petroleum have exceeded your production for use. Only as exploration and wildcatting are encouraged can this nation hope that the long hidden pools of oil far beneath the surface of the earth will be discovered and made available. In other industries, the greater the production, the greater the prosperity, provided that the production can be used. In your industry, over production has resulted in 10-cent oil, which has created unemployment, bankruptcy, ruin, loss of purchasing power. No one benefited from your overproduction except those who, like the jackals and the buzzards, feed upon the dead.

So with the depletion allowances. It is because of the unusual character of the wasting mineral industries and their importance to our national economic life that Congress has given to you this special consideration in its attempt to make the taxes which it levies fair and equitable.

The oil industry suffers from some unjust and improper taxes. We all know that. I wonder if we all know, too, that it is partly and perhaps largely the industry's own fault that some of these taxes were levied. After a tax has once been levied, it is very difficult to secure its elimination or even its reduction. The time to discuss improper taxes is when they are originally proposed. The best way to deal with the various tax problems, whether they are fed-

(Continued on Page 31)

Import Restiction Essential To Constructive Oil Program

By Angus J. Crites
Anchor Oil Co.

FOR OVER SEVEN years the domestic petroleum industry has been struggling to solve the problem presented by an ability to produce crude oil far in excess of the demand for petroleum and its products. Various conservation measures have been adopted, improved upon or discarded in the constant effort to balance supply with demand. It was early recognized by leaders of the industry that only through balancing supply with demand could the industry be stabilized, so that steady employment at good wages could be maintained, waste prevented, a steady supply of the necessary petroleum products to the consumer at fair prices be assured, and the hundreds of millions of dollars in public revenues to cities, states and the nation be continued.

Production

The largest source of supply, of course, is domestic production. And it is but natural that the first concerted efforts to balance supply with demand should have been directed at this largest single source of supply. The efforts to restrict domestic production so that a balance could be maintained have run all the way from voluntary action by a few producers in a single field to national control by federal bureaus. Between these two extremes we have seen statewide voluntary action, regulation by state law, and groups of states working cooperatively.

In the light of experience and judging by results obtained, it is evident that cooperative effort by the various oil producing states is the most effective method yet devised to restrict domestic production.

Stocks

A second source of supply is above-ground stocks, which of recent years have supplied a substantial portion of the total demand. In the period from Jan. 1, 1930, to Sept. 30, 1936, total stocks of crude oil, refined products and natural gasoline have been reduced from 689,166,000 to 532,480,000, a net reduction of 156,686,000, or 63,564. daily.

Nearly every producer recognizes the threat to stability of excessive above-ground stocks and the concomitant benefits to be obtained by a reduction of these above-ground stocks to economic levels. In fact, one of the objectives of the curtailment movement has been to gradually and sufficiently reduce stocks in order to eliminate any threat to stabilization from this source. Many believe stocks have now been reduced to such levels, and the above-ground storage should not, therefore, continue to supply any marked portion of the demand, but should be used solely to absorb seasonal and unforseen fluctuations in demand.

Unfortunately, much of the necessary data essential to the determination of proper economic stock levels have been unavailable. As a consequence, conjecture and individual opinion have been prominent factors. However, the survey now being conducted by the United States Bureau of Mines as to the character and location of stocks will remove many of the unknowns and encourage an early determination of and agreement on a sound storage program. When a report on this survey is made public next year, we can confidently anticipate voluntary action by the industry leading to a determination of economic or desirable stock levels and establishment of a rate for whatever further withdrawals from storage may be necessary to accomplish this objective.

Imports

Imports of foreign oil form the third source of supply and are partially responsible for the undesirable stock situation of the immediate past. Because of the economic effect of imports on the domestic producer and refiner, this subject undoubtedly merits serious consideration.

I am here to discuss the necessity of restricting imports as an essential part of any constructive program for the domestic petroleum industry. But let us first review the effect of unrestricted importations of foreign crude and refined products, during a period when the domestic industry is capable of supplying more than the entire demand such as we have had during the past seven years.

We all know that a low price on a small portion of any given commodity, in the market for that commodity, tends to set the price for the entire market. We have seen and we all remember how this economic law worked during the immediate past, when unrestricted imports of foreign oils amounted to but nine to ten percent of the total demand, yet forced domestic prices down to ruinous levels, leaving in the wake bankrupt producers, unemployed oil workers, reduced wage scales, and deficits, both industrial and governmental. This was but the natural result of free competition with foreign oil produced by peon labor in countries levying but a fraction of the taxes paid by the domestic industry.

Foreseeing the inevitable result of continued free importation of foreign oil while domestic oil was shut in, the Independent Petroleum Association of America was organized at Colorado Springs, Colorado, on June 11, 1929, and announced its purpose in the following words:

"To make the American market safe, stable and at profit for the American producer, the refiner and marketer, is an must always be the chief resolve and effort of all that we propose to do. . . . To accomplish this object we stand ready to join and be a part of—have indeed been a sacrificing part of—any domestic measure, whether conservation or any plan that will tend toward the stabilization of the industry. . . . We have taken and so stand for a protective tariff on petroleum and its products. We are determined to make the fight until a tariff or its equivalent is written into the statutes of the country and for the stabilization of all prices, and the pro-

tection of all American markets for the Americans themselves."

Constantly hewing to this objective, the association finally obtained an addition to the Revenue Act of 1932, imposing excise taxes of 21 cents per barrel on imported crude oil and fuel oils and 2½ cents per gallon on imported gasoline, which became effective on June 21, 1932.

Effect

Imports of motor fuel were eliminated, and imports of crude oil and fuel oil were appreciably reduced, and averaged approximately 105,000 daily during the last six months of 1932, compared with more than 250,000 daily in the period immediately preceding.

To be sure, exports declined in an amount approaching the decline in imports, so that the total demand for domestic petroleum was not increased in an amount equal to the decline in imports. But the excise taxes levied reduced the cost differential between foreign and domestic oils, and reduced the actual volume imported, so that the effect of low cost foreign oil in our domestic market was appreciably lessened. This permitted prices gradually to rise to a point approaching the cost of production. As a consequence, uneconomic and wasteful utilization of this essential natural resource has been reduced, new sources of supply have been discovered, materially increasing the oil reserves of the nation, and steady employment at high wages for oil workers maintained.

These excise taxes are still unchanged on the statute books and have yielded, since their inception more than $30,000,000 in revenue to the Federal Treasury. As domestic production costs, and presumably prices, increase, however, the protective effect of these constant excise taxes diminishes. Concrete evidence of this is the gradual increase in the rate of imports during the past few fears. As we noted earlier, imports averaged 105,000 daily during the last six months of 1932. During 1933, imports averaged 126,000 daily; in 1934, 138,000 daily; in 1935, 144,000 daily; and during the first nine months of 1936, 153,500 daily. These increases have taken place despite the importing companies' promise to limit their importations of foreign petroleum and its products to an amount not to exceed importations during the last six months of 1932, which promise was freely given at the Governors' conference in 1933.

Overproduction cannot be controlled without controlling imports, a necessary part of a stabilization program. Paper presented at the annual meeting of the I. P. A.

Future

Past experience certainly tells us what to expect if this trend toward increased imports continue. Domestic producers will be forced to sell their products at less than the cost of production with a consequent return to the unhappy economic situation from which we have so recently emerged, in which unemployment, bankruptcy and business failures were common.

To permit this to occur is, of course, unthinkable. But what can we and what should we do about it? Two courses seem to be open to us, either of which require action by Congress.

One would be to propose a truly protective tariff, a tariff actually representing the difference in cost of production between foreign and domestic oils. In actual practice, however, the determination of a tariff rate which really affords protection is virtually impossible, unless it is high enough to constitute an embargo. Changes in production costs at home or abroad, and fluctuations in foreign exchange exaggerated by the international race to devalue currencies, are to a large extent unpredictable. Consequently, a protective tariff today may afford no protection whatever tomorrow.

Limitation

The other course open to us is to propose and actively advocate a definite limitatoin on the volume of petroleum imports. For practical reasons the limitation proposed could be a certain percentage of a moving average of the actual demand during the immediate past, to be enforced only so long as domestic production is sufficient.

There are some who believe that even a restricted amount of low cost importations will depress the market to the low cost level. I, however, subscribe to the theory that the **threat of increased** importations of the low cost product is what really depresses the market, and, conversely, by restricting importations of the low cost product, the market tends to stabilize itself at the domestic cost level.

If this latter theory be true, and I sincerely believe it to be, a restriction of imports is certainly an essential part, if not the most important part, of any constructive program for the domestic petroleum industry.

To summarize briefly: The domestic petroleum industry has shown that it can cooperatively restrict the portions of supply over which it has control to balance with demand. It is equally true that the effect of such a restriction is largely nullified without a corresponding restriction of foreign petroleum imports. In the light of experience, voluntary restriction by the importing companies seems unlikely. Congress and The President of the United States should be urged, therefore, to pass legislation restricting importations of foreign petroleum and its products, thus permitting the domestic petroleum industry to contribute its utmost to the continued recovery and prosperity of the United States of America.

■ ■ ■

Robert R. McLachlan has been appointed assistant secretary and treasurer and assistant to the field manager of the G. M. Rheem Co. at Houston, Texas, and has taken up his duties with the company. Mr. McLachlan was for nine years with the land department of the Italo Petroleum Co., first before the receivership, then all through that period and again with the company management. He is a son-in-law of Fred V. Gordon, a pioneer of the California oil industry.

G. L. Kothny, vice president and general manager of the Sperry-Sun Well Surveying Co., a recent visitor to Los Angeles on one of his regular trips of inspection of the company's California activities.

Review of Developments at Kettleman Hills

By R. E. Collom and C. P. Watson

An A. I. M. E. Paper (Part Two)

IN APPROACHING the subject of production curtailment and proration it should be borne in mind that there was not a single operator in Kettleman Hills that had not participated fully in the discussions and voting regarding the various articles and terms of the Kettleman Unit Agreement. Up until the last few days of the 15 months of negotiation, it was asumed by those most active in cooperation with the Secretary of the Interior that the Unit Agreement would be "100% effective."

In the early stages of discussion of the Unit Agreement, several operators were strongly in favor of weighing acreage, according to position on structure and therefore variation in productivity, for participation. This idea was discarded and participation was to be determined on a flat acreage basis. Secretary Ray Lyman Wilbur in his telegram of March 19, 1930, stressed the factor of the acreage basis of participation as follows:

"I appreciate that the proposed plans are rational because they substitute for the expensive and wasteful drilling of offset wells the equitable sharing by the undrilled acreage in the production from the area as a whole."

That was the basis of equitable division of production. In fact, that is the present internal basis of distribution in Kenda. The outside operators in Kettleman having talked and voted and exerted their best efforts to get the unit agreement in such shape as would best handicap operators thereunder in any competitive development scheme, proceeded to operate competitively and refused to accept proration on an acreage basis. They insisted that the small operator is inherently entitled to the lion's share; that the most productive acreage is entitled to be weighted against lesser productive acreage and that unless any given subdivision of acreage is drilled and occupied by a producing well it should not be entitled to consideration in proration. No one should expect that outside operators are bound to conform to the Unit Agreement but the conclusions of both the Advisory Board and the Petroleum Administrative Board were that some recognition should be given to the principle of careage participation.

R. E. Collom

C. P. Watson

Method Controversy

The method of proration therefore became the prime matter of controversy in Kettleman. It led to extended hearings before the so-called Advisory Board during March and April, 1934; appeals of the decisions of that Board and subsequent hearings before the Petroleum Administrative Board in December, 1934. The 705 mimeographed pages of transcript taken before the technical Advisory Board and the 52-page mimeographed report of the Petroleum Administrative Board contain a mass of facts, technical material and considerable misinformation regarding Kettleman Hills.

After all these hearings and labor of engineers, lawyers, and laymen, followed by recommendations and formulae for equitable internal allocation of production in Kettleman Hills, the same gross inequities making for general losses, as to ultimate recovery, to all, remain unchanged.

History of Proration

The history of proration from its beginning down to hearings before the "Advisory Board appointed by the Central Committee", in 1934, is briefly given below by quoting from the testimony of Wm. Reinhardt, Manager of Kettleman North Dome Association:

"In August, 1931, an allotment of 60,000 bbls. per day was made to the field. Of this amount the outside companies were allotted 15,000 bbls. per day, or 25% of the total allotment, and the Standard Oil Co. and the Kettleman North Dome Association jointly 45,000 bbls. a day, or 75%. This allotment, and the same

basis of distribution, continued to October, 1932, when the field allowable was reduced by 10%. The same percentage of distribution, however, continued to and including December, 1932. In the months of January to April, 1933, inclusive, the field allowable varied from 55,000 bbls. a day to 63,000 bbls. a day, and while there were some variations, the percentage distribution remained substantially as in the previous 17 months.

"In May, 1933, the outside companies' allotment was set at 20% of the total which percentage continued during the months of June, July, and August.

"On the adoption of the Petroleum Code and the formation of the Central Committee of California Oil Producers in September, 1933, the allowables were calculated on the basis of a formula which was used during that month for the whole state. This formula gave the outside companies 17.4% of the total allotment to the field. For the month of November, the breakdown was again revised, giving the outside companies 20.6%.

"In December, 1933, the Central Committee suggested that again the Field Committee get together and attempt to arrive at a more permanent procedure for the breakdown. They agreed for the month of December on a schedule which gave the outside operators 18.5% of the total. This schedule was continued for the month of January, 1934. For the month of February, 1934, the Umpire on his own initiative raised the outside acreage percentage to 20%.

"Shortly after the Kettleman North Dome Association took over the operation of the properties of the member companies in April, 1931, meetings of the various operating companies in the field were held to attempt to arrive at a method whereby there would be equitable distribution of the allowable in the field. There had been very little restraint on production up to this time, except that which was caused by the limitations of outlet.

"After a long series of discussions extending to approximately Aug. 1, a temporary agreement was reached whereby the outside operators would receive 25% of the field's allowable and the Standard Oil Co. and the Association 75% jointly. This breakdown was vigorously protested by both the Association and the Standard Oil Co., and was only accepted when they were advised in no uncertain terms that the outside operators would agree to no less. The outside operators simply stipulated individually what the absolute minimum was that they would accept. The accumulation of these minimum stipulations amounted to the 15,000 bbls. a day which was previously mentioned.

"Very little beneficial results was secured from these efforts. While the Association and the Standard Oil Co. during all this period had adhered strictly to the principle that acreage distribution is the only equitable and fair method for this field, they offered several compromise plans in the hope of arriving at a method which would be acceptable to all, even temporarily, thereby affording some relief under these intolerable conditions. These offers of compromise were, however, always refused by the outside operators.

"At a meeting held early in December an arbitrary breakdown for the month of December was agreed upon. A subcommittee of the Field Committee was then appointed to attempt to draw up a plan which would be acceptable. This committee also failed to reach an agreement. In January, 1934, at another meeting of the Field Committee, another compromise plan was offered by the Standard Oil Co. and the Association members. This plan also having failed to get the support of the outside operators, the matter was referred to the Central Committee for action. The Central Committee, hesitating to act on a matter which involved so many opposed ideas, passed a motion to appoint a Board of Arbitrators to develop a plan; this compromise plan which had been offered providing, among other stipulations, for arbitration to take care of controversies which might develop in the functioning of the plan.

"This motion named one of the members of the Board of Arbitration in the person of George W. Holland of the Geological Survey, stipulating that one member should be selected by the Standard Oil Co. and Association group and the other by the outside operators. The outside operators refused to make a selection or leave the matter to this Board of Arbitration. The matter having gone back to the Central Committee, your Board (Composed of R. P. McLaughlin, W. N. Lacey and Walter S. Clute) was selected.

"The Kettleman North Dome Association has always maintained and still maintains that the only fair and equitable method for the distribution of the field's allowable is on an acreage basis. All of the deferment of development in this field has this principle as its foundation. The very prosperous conditions which have prevailed in this field for the outside operators have only been possible because of the willingness of the Standard Oil Co. and the Kettleman North Dome Association to defer their development operations.

"It has often been said in the course of discussions in Field Committees, and otherwise, that this deferment, both on the part of the Standard Oil Co. and the Association, was purely a matter of selfish interest. There may be something in that. I am not at all inclined to believe that any of us are apt to go very far against our own selfish interest in the development of our thoughts in matters of this type. However, the fact still remains that while that definitely may be charged to certain of the larger integrated companies who are involved in this picture, it certainly does not apply to many of the smaller operators, particularly those in the Association, and also it very definitely does hold that, even if that charge were true of all of the interests in the Association, the outside companies have quite definitely profited by this curtailment and its general effect of holding up the prices of crude in the field.

"As will be shown by others, this deferment has resulted in enormous losses to both the Standard Oil Co. and the Association, and can only be remedied by proper consideration's being given to the presently undeveloped acreage of the two companies in the distribution of the field's allowable".

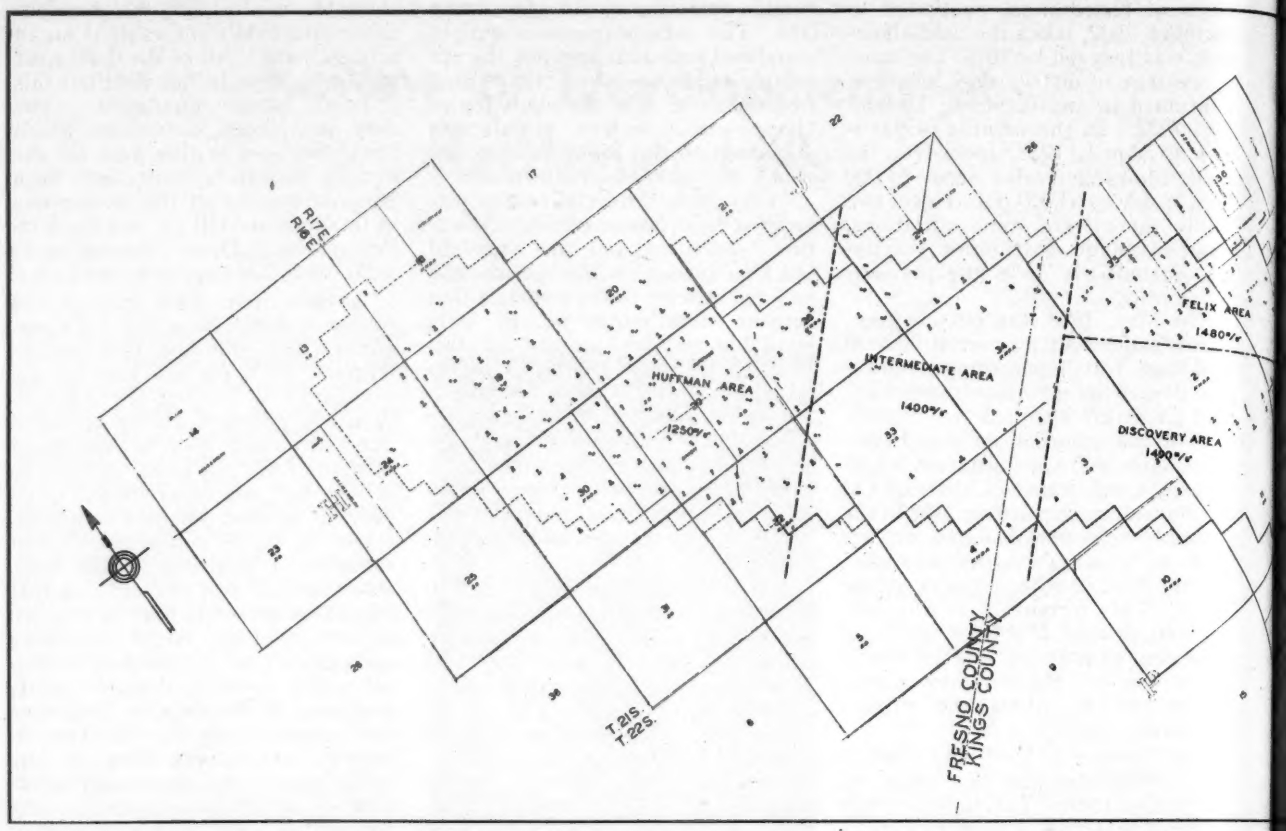
Inequitable Drainage

That drainage and inequitable distribution of production was and is taking place is shown by quoting testimony of N. A. Rousselot, of Seaboard Oil Corp. and a director of Kettleman North Dome Association, before the Advisory Board as shown on pages 105 and 106 of Part I of the transcript:

"The allocation of production in Kettleman Hills has been divided among three major groups:

1. The Kettleman North Dome Association, which is a banding together of 14 companies, has under its control 8060 proven acres (participating).

2. The Standard Oil Co., 7800 proven acres (participating).



3. Outside companies, 510 proven acres (participating).

"This makes a total of 16,370 acres.

"The Standard Oil Co. and the Kettleman North Dome Association have balanced production between themselves on an acreage basis since the inception of the Kettleman Hills North Dome Association with very little difficulty.

"To date, that is to Mar. 1, 1934, the Kettleman North Dome Association has produced 29,908,416 bbls. from 8060 proven acres (participating), which is 49.2% proven acres (participating) of the field.

"The Standard Oil Co. has produced 23,351,348 bbls. from 7800 proven acres (participating), which is 47.7% of the field.

"The outside companies have produced 19,319,340 bbls. from 510 proven acres, (participating) which is 3.1% of the proven acreage (participating) of the field.

"The Kettleman North Dome Association, on these figures has produced 41.21% of the field production from 49.2% of the proven acreage (participating).

"The Standard Oil Co. has produced 32.17% from 47.7% of proven acreage (participating).

"The outside companies have produced 26.62% from 3.1% of the proven acreage (participating).

"Just to illustrate what this means to one of the companies, the Milham Exploration Co., the discovery company of the field, which brought the field on to production in October of 1928, this company has 1710 proven acres (participating) within the field and has received both from the discovery well before the formation of the unit plan and the allocations allowed them by the Kettleman North Dome Association, to Mar. 1, 1934, 6,927,625 bbls., whereas the Superior Oil Co., which has 160 proven acres, (participating) has produced 7,042,333 bbls. from .97% of the field's proven acreage (participating).

The basis of allocation on Sept. 1, 1936, for a field allowable of 77,250 bbls. was:

	Barrels	% of Allowable	% of Acreage
Kenda	34,410	44.6	49.7274
Standard Oil Co.	32,447	42.0	47.0018
Union Oil Co. ..	4,000	5.2)	
Superior Oil Co.	4,000	5.2) 13.4	3.2708
Others	2,393	3.0)	
	77,250	100.	100.

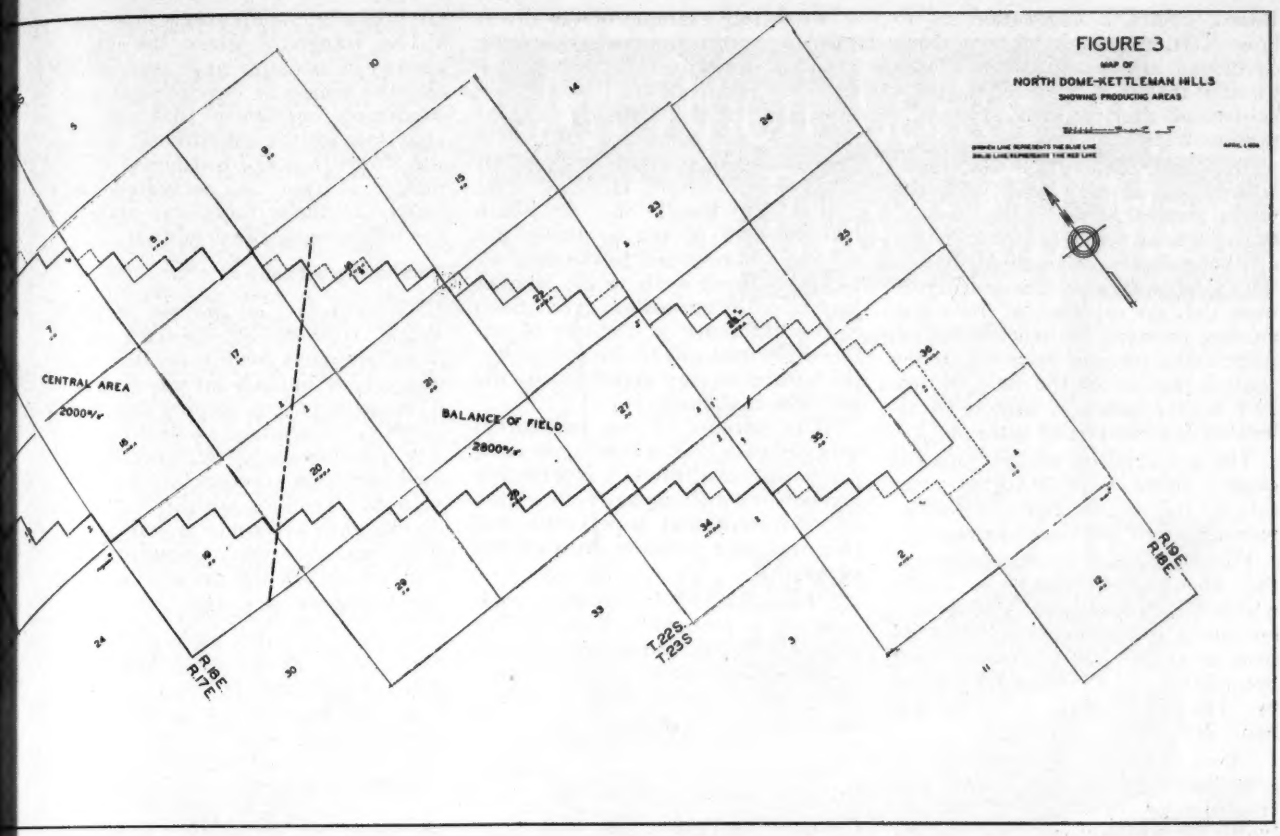
Drainage Foci

These continued and extreme inequities in allocation of production coupled with the fact that Kettleman North Dome Association is distributing its allowables for maximum protection against drainage from outsiders in sec. 29 has set up some severe low pressure areas characterized as drainage foci.

In this connection the following is quoted from the report of the Petroleum Administrative Board of Mar. 25, 1935:

"Individual well production records disclose some remarkable wells in the North Dome. As of Jan. 1, 1935, 31 wells had produced more than 1,000,000 bbls. of oil each with a total production of 68,048,917 bbls. for the group. Outstanding among these wells is Huffman 1 of the Superior Oil Co., which had produced approximately 5,798,505 bbls. to Jan. 1, 1935, and which undoubtedly will rank eventually as one of the most productive wells of the United States.

"While it is probable that there are many fields where drainage areas show pressure gradients of greater magnitude than exist in the North Dome, still the exhibits show conclusively that there are at least two notable drainage foci in that field. Drainage gradients to these foci and pressure differentials surrounding them are of such magnitude as to be very conducive to the



migration of hydrocarbons toward those foci. One of the principal points of argument has to do with which properties should be the sites of the drainage foci.

"It is impossible in theory and in fact to avoid areal drainage foci in continuously produced competitive fields but it is possible to reduce observed existing gradients by producing less in the area of lowest pressure and more in the peripheral areas of higher pressure, or by shutting the entire area in for a sufficient time to re-equalize subsurface pressures over a wide area, during which time migration of fluids to the low pressure center will of course continue. It is probably possible to develop a concentric low pressure ring around a given area but in a competitive area close to edgewater an attempt to isolate one low pressure center by a still lower pressure belt around it would probably be both hazardous and inexpedient.

"In the North Dome it seems not improbable that the drainage gradients owe their genesis to the discovery wells of the focal areas and that present gradients, though of wider range, may not be as great as in the past when production was even more concentrated than at present. Nor is it unlikely that drainage losses suffered by some properties in the past were much greater than those occurring now.

"To make pressure gradients more equitable at this time and under present conditions would be a most difficult undertaking. It is not at all unlikely that **if the North Dome were unit owned and operated** there might be low pressure foci just as significant as those now present. However, drainage to other properties and operators would not result.

"The problem of preventing avoidable physical waste and of serving the public interest through the conservation of the petroleum resources in the field, in the Board's opinion, cannot be met solely through the promulgation of an allocation method or formula, because the solution of the problem involves, also, the adequate and systematic development and production of the field. If the field quota and its distribution within the field is maintained at its present level under present conditions, the factors which are conducive to waste will so continue and if the field quota were to be increased and the increase applied to existing wells, it appears that the conditions of production would be even more conducive to physical waste.

"The situation in the Kettleman North Dome is complicated further by the existence of a 'gas cap' area from which natural gas, accompanied by some production of 'white' oil, is withdrawn in part for the purpose of furnishing a natural gas supply transported through pipe line to the San Francisco Bay and Los Angeles Basin regions where it is utilized for domestic, industrial, and commercial fuel purposes. Although it is recognized commonly that equity should be maintained between volumetric withdrawals of free gas and oil from a field, the Board feels that the excessive withdrawal of gas from the 'gas cap' area or the production of oil with an excessive gas/oil ratio would result in a waste of reservoir energy and, in some instances, an irregular encroachment of water. The Board also is of the opinion that the excessive withdrawal of gas from any structure, even though the gas may move through pipe lines for purposes of serving fuel needs, is wasteful in its relationship to energy required for maximum oil recovery equally as much as if such excessive gas production were blown into the air".

Quoting again from the report of the Petroleum Administrative

Board, comes a suggestion as to how Kettleman should have been developed and produced, assuming by now that it is admitted that the subject of this paper is at least a pertinent question:

"Had the field been developed strictly on a unit basis with the wells located scientifically around the fringe of the field in the 'black oil' belt to take full advantage of the gas pressure down-structure from the 'gas cap' and of the water moving up-structure from the edge, Appellants, owning property in the central portion of the field in sec. 29-J would have initially been allocated few wells and little oil".

The prescription of development quoted above is probably as accurate as the requirements of Kettleman's present situation warrant.

For some further suggestion of the formulae or concepts under which Kettleman should have been operated, the following is quoted from an article written by J. Arthur Sohn in the "Lamp" and reprinted by "The Oil Weekly" in its issue of Sept. 21, 1936:

"Two of the most interesting recent developments in Oklahoma exemplify the striking contrast between the wasteful methods of other days and the modern cooperative system. In the heart of the old Osage nation, in the peaceful, rolling pasture land of northern Oklahoma, the South Burbank Pool is the scene of the most advanced unit operation ever attempted in the state.

"No better example of the diversity in producing and operating methods utilized at the same time was ever manifest. In the early development of the Mansion field, as the new extension at Oklahoma City is called, gas was popped off into the air before facilities were available to handle it. At South Burbank, all of the available gas produced is returned to the sand by means of input wells to lift another load of oil in an endless cycle. Such is the difference in the use of nature's greatest gift to the operator—the natural energy generated by the pressure of the reservoir.

"The purpose of the unitization was to gain the advantages of a single operator, thereby eliminating competitive drilling and duplication of equipment and supervision and to carry out a **pressure maintenance** program.

"'Only a dry hole can stop an oil field'—it is probably still true. But a little cooperation can make it last longer, yield more and cost less. They far outweigh any temporary advantage. Gradually, from contrasting experiences like Oklahoma City and South Burbank, the industry is coming to realize that".

Competitive Drilling

At Kettleman competitive drilling is not eliminated. Oil is being left in the ground. Gas is being withdrawn not in the manner best adapted to recover maximum quantity of hydrocarbons but in the manner that will maintain a saturated outlet to the gas utilities. There is no pressure maintenance program.

The foregoing gives the background of attempts at conservatism and the tempo of development and producing operations that are responsible for the condition in which the North Dome of Kettleman Hills now finds itself. As accurately and briefly as the authors' can state it the following is the condition.

Producing Zones

The Temblor oil horizon at Kettleman Hills consists of hard sandstone which is locally divided into many beds by thin layers of shale. The participating area of the field has been determined as 16,510 acres. For convenience of reference in the field and from an operating point of view the Temblor horizon has been divided into five zones as follows. A sixth zone has made some production which for the purpose of this discussion we may omit.

	Feet Thickness
First Zone	300
Second Zone	275
Third Zone	175
Fourth Zone	210
Fifth Zone	345-425

Attached Fig. 4 shows a typical cross-section.

Subject to certain reservations, it can in general be said that the upper four zones inside the minus 5800-ft. subsea contour produce light 60° A.P.I. oil, together with a large gas/oil ratio varying from 20,000 to 100,000. This area is gener-

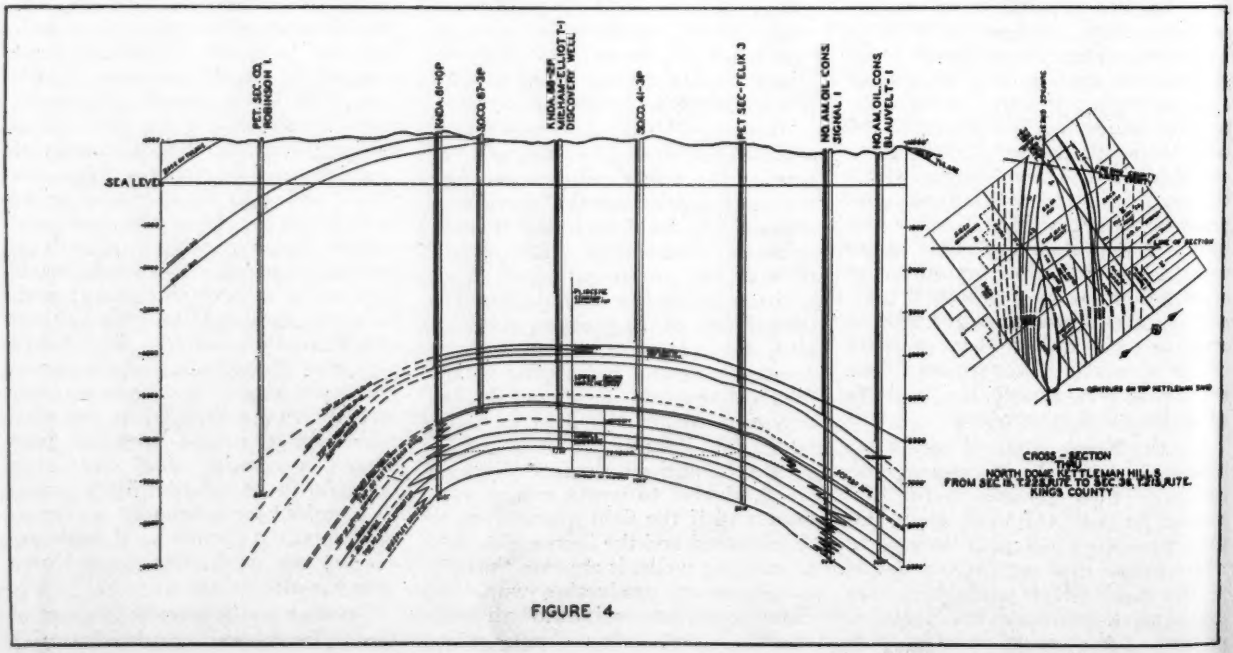


FIGURE 4

ally referred to as the "Gas Cap Area".

The area outside of the Gas Cap is known as the "Black Oil Zone". Black oil of 33 to 37° A. P. I. is produced from the Second, Third, Fourth and Fifth Zones in the Black Oil Area. The gas/oil ratio in the Black Oil Area varies from 500 to 5000 but averages about 1500.

Volumetric withdrawals, assuming 1000 cubic feet of gas at the surface occupies the same space in the formation as a barrel of oil, from date of discovery to April 1, 1936, totaled 936,218,755 bbls., of which 125,168,499 bbls. represented oil and 811,050,256 represented gas. It is important to bear in mind that 86.6% of the total volumetric withdrawals have been in the form of gas and only 13.4% produced as oil with a gas/oil ratio higher than six to one.

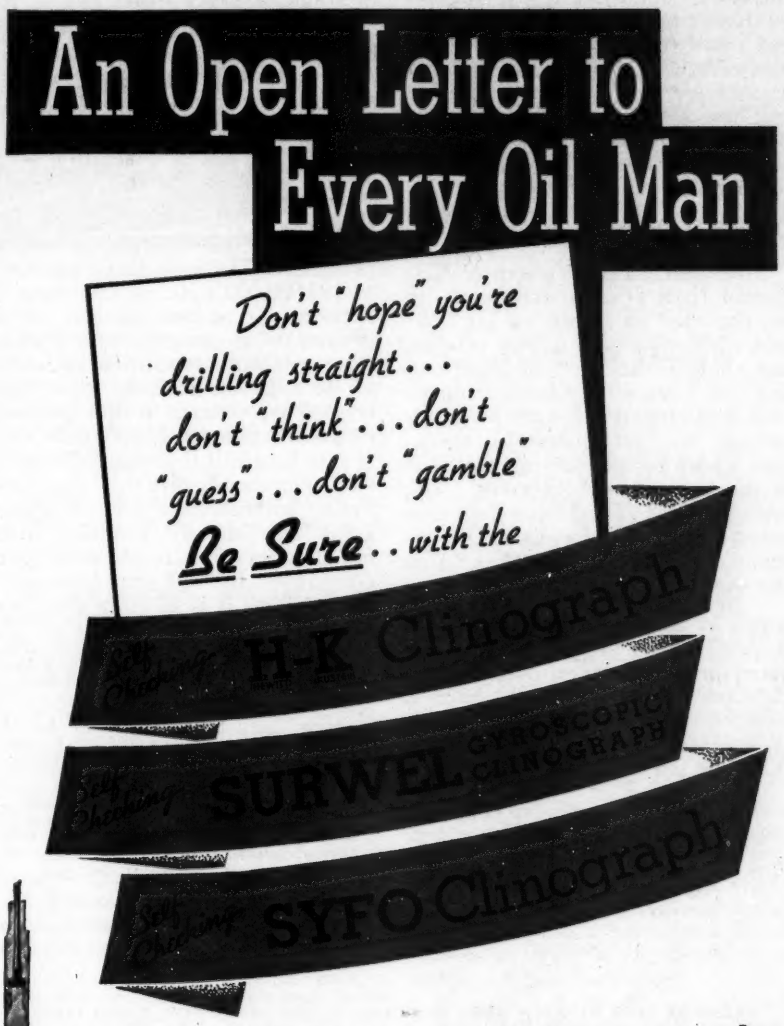
Reservoir pressure is diminishing at an alarming rate. In the active producing areas losses during the two-year period ended in April, 1936, vary from one-half pound per day in the Felix area to a pound and a half per day in the Huffman area.

On the basis of production at Kettleman Hills to April 1, 1936, there has been a decline of one pound for each 41,000 bbls. of oil produced in the Huffman area and a decline of one pound for each 23,500 bbls. of oil produced in the Felix area.

P. A. B. Conclusions

On Mar. 28, 1935, the conclusions of the Petroleum Administrative Board, with reference to the method of making intrafield allocations, were embodied in an order of the Petroleum Administrator. The Board concluded that as a result of its consideration of evidence submitted, subsurface pressure contours should be employed in the calculation of well allotments in such a manner as would provide for the establishment of more uniform pressure gradients throughout the field. In its recommendations, the Board attempted to establish a basis of volumetric withdrawals whereby volumes in the "gas cap" area and in the "black oil" were balanced. Also incorporated in its recommendation was the requirement for determining the relative productivity of wells. By relative productivity was meant the comparative ability of a well to withdraw oil from the producing formations without causing excessive pressure gradients or other conditions conducive to waste.

Testimony presented before the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Advisory Committee in Los Angeles by Kettleman Hills operators two and a half years ago emphasized the importance of maintaining uniform pressures. Extended hearings before the Petroleum Administrative Board in December, 1934, further emphasized the necessity of conserving the gas energy.

Decline in Pressure by Areas

The areas shown on map of Kettleman Hills (Fig. 3) have come to be regarded as areas having certain distinct operating and producing characteristics. The Huffman and Felix areas have been competitive areas where the rate of development was established by operators whose lands were not included in the Unit Plan Agreement. The remaining four areas have been designated as the Intermediate, Discovery, Central and Balance of field on the south end.

In the tables found below are shown number of wells, area, pressures and volumetric withdrawals for each subdivision as of April 1, 1936. Bottom hole pressures are all on the basis of a datum plane 7000 ft. below sea level.

Average Pressure Loss

The average bottom hole pressure loss for the entire field has been 33.4%. In arriving at this percentage loss the south portion or area designated on Figure 3 as "balance of the field" and representing 26% of the entire area, is shown with original pressures still available. When it is found that 74% of the entire field has suffered a loss in pressure of 33.4% against a recovery of 125,000,000 bbls. of oil, there is occasion for serious concern. There is even more cause for alarm when facts are available to show that 55% of the field has suffered a pressure loss of approximately 50% with oil recovery of only 122,000,000 bbls. If it is assumed that the 55% of the field embraced within the Discovery, Felix, Intermediate and Huffman areas has already produced one-fourth of its ultimate production, accompanied by an actual pressure loss of 50%, it is of more than academic interest to speculate on the cost of recovering the remaining reserves. Perhaps we are justified in borrowing an expression from the mining industry and refer to the past as "a high grading method".

Pressure Maintenance Essential

Pressure losses have been largely due to excessive gas withdrawals which result in the production of five to six volumes of gas per volume of oil. Some 20 high ratio wells have contributed more to the depletion of reservoir energy than all of the other wells in the field. Shutting-in such wells would do more good than shutting-in all of the low ratio wells. There is little doubt that the ultimate recovery from a field will be increased if the reservoir energy is utilized uniformly and evenly over the entire field. Low pressure sinks result in premature water intrusion.

A recent survey of producing operations in the field shows 40 wells on gas lift and 29 wells making a water cut of 10% or more. This must be regarded as an impressive warning of the problems to be faced in a field where, because of the depth of the wells, every precaution reasonably possible should have been exerted towards maintaining flowing conditions. There is justifiable cause for alarm when 69 wells out of a total of 183, on Sept. 1, show such effects.

Prospects of pumping oil from depths of 8000-9000 ft. are distinctly unfavorable, both physically and economically. Figures on the cost of pumping oil from the Clark Zone at Santa Fe Springs show a net fluid cost varying from 87 cents to $1.77 per barrel. Various types of pumping equipment are being tried at the present time in the Kettleman Hills field but thus far results have not been encouraging.

It is still possible to retard pressure losses as production can be secured from wells with gas/oil ratios of 1000 c.f. or less. If it is assumed that approximately 370 pounds is the minimum flowing

(Continued on Page 31)

Wells	Area	Acres	Production Bbls. Oil	Production MCF Gas	Average Static Bottom Hole Pressure
84	Huffman	3,830	63,730,963	151,397,050	1250
22	Intermediate	2,380	15,590,824	109,928,911	1400
29	Felix	1,070	31,048,591	179,547,219	1480
13	Discovery	1,690	10,959,110	353,794,898	1490
7	Central	3,220	3,411,419	14,803,259	2000
6	Balance	4,320	427,592	1,578,919	2800
161		16,510	125,168,499	811,050,256	

PRESSURE LOSS BY EACH AREA IS SHOWN IN THE FOLLOWING TABULATION:

Area	Acres	Assumed Original Pressure Lbs.	April 1, 1936 Pressure Lbs.	Loss Lbs.	Per Cent
Huffman	3,830	2,800	1,250	1,550	55
Intermediate	2,380	2,800	1,400	1,400	50
Felix	1,070	2,800	1,480	1,320	47
Discovery	1,690	2,800	1,490	1,310	46.8
Central	3,220	2,800	2,000	800	28
Balance	4,320	2,800	2,800	.....	..
	16,510	2,800	1,863	937	33.4

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"It's a funny thing," says Max App, "that the guy who is always kicking about his wife driving from the back seat, is the very same bird who usually sits out in the living room and does the cooking."

■ ■

And Frank Burt bemoans the fact that about the time a fellow gets up to the place where he can take a couple of hours off for lunch, the doctor pins him down to a glass of buttermilk.

■ ■

Speaking of doctors reminds us of the rousty who called his girl "Appendix," because it cost so much to take her out.

■ ■

"Is there really such a thing as a tobacco trust?" asked the Santa Fe Springs pumper, and Ike Burroughs answered innocently, "Oh, yes", whereupon the pumper continued, "Well, would you trust me with a plug of Mail Pouch?"

■ ■

And we are still wondering who makes the second best cigarettes.

■ ■

Discussing an automobile accident, Bill Abernathy explained, "This driver had the right of way, but the other one had a truck."

■ ■

Now in the manner of Walter Winchell, we might mention that a certain well-known young oil worker in the Signal Hill district has either grown very thin in the face or else has quit chewing Copenhagen snuff.

■ ■

Also a decidedly obese gentleman out at Richfield is trying to correct the error of his weigh.

■ ■

And Perry Cullen, with nothing particular in mind, except to correct a prevalent misunderstanding, points out that half a loaf is better than no vacation.

■ ■

To which we might add that the guy who is born in Lower California is not necessarily of humble origin.

■ ■

Walt Savage says it is absolutely suicidal for any man with a shady past to enter politics, and so we have decided to lie low. We have never mentioned the fact before, but we once kept a library book out three days over time, and were fined six cents.

■ ■

By the way, there doesn't seem to be a library in this town where a chap can get a book that's unfit to read.

■ ■

And Al Weil, who should know, says the oil business is tottering to another successful year.

■ ■

Bill Groundwater remarked to Al some time ago that business was looking up, and the latter replied, "Yes, so is a man who is lying on his back."

■ ■

Bill is without doubt the most enthusiastic hunter in the oil industry, and he has always felt that something more should be done to preserve our game. "It's only because these small English cars are not fur-bearing," he says, "that they ever manage to survive the rabbit shooting season."

■ ■

Now by way of a tip to campers, Joe Scanlon, our Fillmore correspondent, points out that the way to tell a grindstone from a waffle is to stick a knife into it. If the knife breaks it's a waffle.

■ ■

Bob Roberts here brings a strange story about an advertising man who was proposing to his girl. "Remember," he said, "Tomorrow is the final day of this astounding offer."

■ ■

One of the niftiest pieces of news reporting we have seen in a long time appeared in an oil town paper just a few days ago. It read as follows: "When Oscar Oodles was going down town this morning he had a premonition that he was going to die, so he ran into a telegraph pole and made good."

■ ■

And Walt Moore explains that a Pan American is just a married man emptying the tray under the ice box.

■ ■

Now pity the poor doctor who was scared to give gas to the patient in case he wouldn't know when he became unconscious.

■ ■

An English magazine says Americans are weak in creating intricate things requiring deep and solid thought. The English magazine has apparently never tried to read the Social Security Act.

■ ■

Or attempted to understand a pipeline map.

■ ■

According to George Thompson, there are two kinds of people in the oil industry—the indigent and the indignant.

■ ■

In conclusion, we would ask our readers to drive especially carefully during the Christmas season. Remember that two wrongs in this case are almost certain to make one rite.—R. S.

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Production

Standard Rosedale Wildcat In Oil Sand; Apparently Opens New Field

WITH 67 FT. of oil sand at the bottom of the hole, Standard Oil Co's. KCL 11-1, on sec. 19, 29-26 in the Rio Bravo or Rosedale district of Kern county, has apparently opened a new field. The well is approximately seven miles north of the 10 Sections area, and is the first well to be drilled as a result of Shell's discovery of 10 Sections actually to give any real indication of production.

Standard's well is down 7807 ft., with 9-inch casing being run to 7740, preparatory to a test. The success of the well has led to a leasing campaign to the north and northwest, where several parcels of land are open.

The Associated's KCL No. 1, in the same area on sec. 30, 29-25, is cleaning out at 5700 ft., with the total depth at 7683.

10 Sections

Standard's chances in the 10 Sections area also look brighter. Its KCL 9-1 on sec. 34, 30-26 has at last entered a formation carrying some oil showings at 8170 ft., and will run a logging instrument to determine just how valuable the showings are. The oil showings, with some shale, were cored from 8170 to 8190, but cores from 8190 to 8218 showed gray sand with no oil showings.

Shell Oil Co's. KCL 34, on sec. 29, 30-26, is drilling at 5220 ft. in sand and shale, and British American's Smith 1A, on sec. 31-27 is standing with 20-inch casing cemented at 155 ft.

Standard's KCL 10-1 has recovered the drill pipe and is cleaning out, with the bottom of the hole at 8700 ft.

Superior Oil Co. is in hard gray shale at 7856 ft. in its KCL 8 on sec. 11, 30-26.

Striking of streaks of oil sand by the Hall-Baker Co. in its Tejon ranch corehole No. 1-10, sec. 12, 10-19, points to the possibility of a new producing area. The drill is now at a point below 2130 in shale with repeated streaks of oil sand with showings of oil since 1900 ft.

Buffalo Oil Co. of Long Beach, operating with production at Mountain View, has taken over the well technically spudded in several weeks ago by the 99 Oil Co., sec. 5, 10-9, and is drilling ahead in what may prove to be the first commercial well in the Grapevine area of the Tejon ranch.

Reserve Oil & Gas Co. has spudded in its No. 33-2, sec. 33, 11-19, Tejon ranch, and is drilling ahead. It is the intention to gun-perforate the old Ritchie well for 100 ft. and see if it can be made a producer. It is bottomed at 5000 ft.

On sec. 22, 3-20, west of the Edison field, and on part of the Tejon ranch not previously drilled, the East Edison Oil Co. of Taft, has been testing a shallow wildcat well. Reports as to its next move are conflicting. Form the field comes the announcement that a new well will be drilled at once, but in Los Angeles parties interested in the lease say they are informed that the present hole is to be carried deeper. Howard Bell, Kern County oil operator, is head of the company, and Jack Emrich is superintendent.

Ohio Oil Co's. Title Insurance No. 2, the deepest test in the area, is down 5731 ft. in streaks of shale in gray sand.

Devil's Den

There is only one active drilling well in the more or less wildcat area in sec. 20, 25-19, and it is down only 700 ft., in hard gray sand. The well is being drilled by H. C. Long. Den Petroleum is idle at 1300 ft. and Carl A. Lundberg has gone no farther than making a location. The Lube Oil Co. No. 1 on sec. 2, 25-18 is standing cemented at 275 ft.

Other Valley Wildcats

General Petroleum has cemented its Arvin No. 1, sec. 26, 31-29, at 7500 ft., and will clean out to bottom and run a combination liner.

Mohawk Petroleum's Earl Fruit Co. No. 2 is standing cemented through perforations at 6100 ft., on sec. 10, 31-29. Earl Fruit Co. No. 3 has erected the rig. It is on sec. 4, 31-29.

Shell Oil Co's. Greer No. 1 has been cleaned out to 6148 ft., and Superior has built foundation for its Arvin Community No. 1 on sec. 26, 31-29.

The C. C. M. O. Co. spudded in its No. 7 at the first of the month and is drilling at 272 ft., on sec. 6, 28-29, in the Round Mountain area.

■ ■ ■

Dearborn Gets Producer In Torrance Extension

THE DEARBORN OIL CO., which some time ago took over the Flint lease in the Torrance-Redondo area from Standard Oil Co., has completed its Flint No. 1 for approximately 350 bbls. of 27 gravity oil per day.

The well was drilled to 4556 ft., taking in 256 ft. of producing zone. This depth is the same at which the C. C. M. O. Co. completed its Del Amo No. 23, and the well makes an extension of about a half mile of this zone.

The drill stopped in oil formation, which leaves the possibility of greater production at greater depths. At the first of the week, the cut was 15%, with pressure of 100 pounds on the tubing and 800 pounds on the casing. Dearborn will start the immediate erection of a derrick over the old Flint No. 2.

Richfield El Segundo Well Making 2600 Bbls.; Terminal 1 Gets 3rd Sand

GENERAL PETROLEUM Corp. has discovered a new producing sand in its Terminal No. 1, Wilmington. The well came in on Monday morning, making approximately 50 bbls. per hour, but had not cleaned up sufficiently, nor had it been on production long enough, for an accurate gauge as to the amount and gravity of the oil to be made.

The well is tubed to 2965 ft., with the top of a cement plug at 3625, and it is from between these two points that the production is coming. This is a new zone, and makes the third producing level discovered by the company in this well. The latest discovery lies between the known upper and known lower producing zones.

The well has been drilled to a total depth of 6814 ft., and has recently been pulling out of the hole, testing all possible productive zones.

The company's Patton No. 1 is drilling and coring at about 3000 ft., with no incidents of importance.

At the first of the week, Gauthier Oil Co. was bailing its No. 1, and had a foundation in for its No. 2.

Petroleum Marketing Corp. has the foundation in for its first test of the area, and Royalty Service Corp. is grading site.

Selegna Oil Corp. is in oil sand, with the drill at 3503 ft.

Sunset Oil is rigging up, getting ready to install a pump at its Lupie No. 21.

Richfield Gets Producer

Richfield Oil Co. has brought in the first real producer in the El Segundo area, where its El Segundo No. 1 came in for 2600 bbls. of 29 gravity oil on Monday morning from 7438 ft. The producing zone was topped at 7322 ft., where the state approved the water shut off, leaving 16 ft. of formation to draw from.

On Tuesday morning, the well was making from 2600 to 2700 bbls. per day.

The company has 80 acres in the area under lease, but has not yet decided upon further drilling. Other companies holding surrounding acreage will undoubtedly start offset wells, the area being well leased up.

It is somewhat ironical that Richfield should discover this new area just as the court has announced that he will accept the reorganization plan submitted by Consolidated Oil Corp. One of the reasons for a Richfield reorganization has always been the company's need of greater supplies of crude, it having been necessary for Richfield to purchase approximately 80% of its crude requirements.

Other Basin Wildcats

Universal is in sand and shale in its Carrell No. 1, in the Gardena area, at 5512 ft.

Barnsdall is in hard shale at 5546 ft. in its Rancho San Francisco, in Newhall.

■ ■ ■

Wyoming Well Down 1000 Ft.

Wood-Callahan Oil Co.'s Wyoming drilling project on the Hidden Dome structure, Washakie county, is down to 1000 ft., according to a report from Bob Hume, who is in charge of drilling operations. Cable tools are being used on the project, and the pay zone is expected around 2000 ft.

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• California • Production

AVERAGE PRODUCTION
November 28 to December 4, 1936, Inclusive

	December Quota	Barrels Production
San Joaquin Valley		
Belridge—North	11,125	14,512
Belridge—South	1,975	1,830
Buena Vista	16,835	17,369
Coalinga—East	11,740	10,325
Coalinga—West	5,370	5,895
Coffee Canyon	4,825	4,744
Edison	5,290	5,397
Elk Hills	8,160	8,268
Fruitvale	7,930	8,989
Kern Front	10,090	9,999
Kern River	3,380	2,230
Kettleman Middle Dome	275	249
Kettleman North Dome	77,150	76,039
Lake View	3,170	6,937
Lost Hills	4,305	3,477
McKittrick	3,680	1,658
Midway-Maricopa	35,000	39,251
Mount Poso	15,720	17,602
Mountain View	21,305	20,455
Poso Creek	1,910	1,895
Round Mountain	7,020	5,426
Ten Section	695	1,037
Wheeler Ridge	340	303
Others	.....	.....
TOTAL	257,290	263,887
Coastal District		
Capitan	1,855	1,781
Elwood	10,940	10,739
Padre Canyon	440	600
Rincon	1,940	2,124
San Miguelito	1,155	1,654
Santa Barbara	1,030	974
Santa Maria	4,955	4,916
Santa Paula-Newhall	4,255	4,789
Ventura Avenue	29,980	34,646
Others	360	195
TOTAL	56,910	62,418
Los Angeles Basin		
Alamitos Heights	1,495	1,663
Brea-Olinda	7,975	7,627
Coyote—East	2,275	2,409
Coyote—West	7,870	7,554
Dominguez	23,055	24,723
El Segundo	310	326
Huntington Beach—New	18,395	20,884
Huntington Beach—Old	13,515	15,125
Inglewood	13,020	11,203
Lawndale	80	81
Long Beach	59,805	64,950
Los Angeles	645	721
Montebello	6,325	5,651
Montebello Extension	2,095	3,093
Playa Del Rey	11,050	11,132
Potrero	290	272
Richfield	6,910	6,770
Rosecrans-Athens	1,990	2,131
Santa Fe Springs	41,300	44,324
Seal Beach	7,390	6,390
Torrance-Hermosa	5,600	6,302
Torrance Extension	1,825	1,961
Whittier	995	1,043
Others	630	431
TOTAL	234,840	246,766
STATE TOTAL	551,000	573,071

■ ■ ■

Martin Plans Wildcat

J. D. Martin is planning to start another well in San Luis Obispo county, north of the Arroyo Grande area.

Doyle Petroleum May Get Jasmine Producer

DOYLE PETROLEUM may yet have a producing well in the Jasmine area, sec. 15, 25-27, Quinn ranch, Kern county. Sixty feet of oil sand have been uncovered at a plugged depth of 2882 ft., and it is said shows signs of good saturation. However, the trouble now is that the sand comes in and thus far has prevented a satisfactory test. M. N. Young, who with his associates holds the original lease and a large surrounding block, is of the opinion that the well will produce commercially once the sand problem has been solved.

So far there has been no move to start another well. The report from Bakersfield last week that material was already on the ground for that purpose proves to have been premature. There appears to be plenty of reason, however, to believe that if this well fails commercially others will be drilled in the immediate vicinity; if not by the Doyle Petroleum Co. then by some other operator.

No other wells have been drilled here, except one quite recently abandoned. Southeast, the nearest other tests, all commercial failures, were about seven miles distant; eight to ten miles northwest is a group of abandoned wells, the deepest 3300 ft., in the south half of twp. 24-24. There are other abandoned wells about eight miles northeast. Some of the wells to the south, however, had encouraging showings. Much of the drilling was done by small companies, many of them poorly financed.

■ ■ ■

Haney Seeks Operator

W. B. Haney, Whittier real estate operator, has assembled a block of some 5000 acres in the Elkhorn Valley, San Luis Obispo county, and is negotiating with several companies for drilling a test well. He flatly denies the report that he will drill himself, but says he hopes to have a well started not later than Feb. 1. He also says that reports that a location has been selected in sec. 10, 11n-26w are incorrect and that nothing has been decided upon as to the location of the well.

■ ■ ■

Redondo Well To Start

The Leora Oil Co. is planning to start a well at 11th and Prospect, Redondo.

Drilling Report

Oil field operations reported during the week ended Nov. 29, show 13 notices to drill new wells filed, as compared with 31 during the previous week. 1 was in Coyote Hills, 1 in Long Beach, 1 in Richfield, 1 in Wilmington, 1 in Los Angeles county, 1 in Elwood, 1 in Santa Maria Valley, 1 in Monterey county, and 5 in Kern county. Total new wells this year, 1000, as compared with 917 at the same date last year.

Deepening or redrilling jobs this week numbered 13, the same number as during the previous week. Total to date, 735; total to same date last year, 735.

Abandonments numbered 3, as compared with 9. Total to date, 423; total to same date last year, 370.

	Well No.	S.	T.	R.
NEW WELLS				
Coyote Hills				
V. R. G. Wilbur				
Ward-Johnston	1	20	3 S	9 W
Los Angeles County				
Shell Oil Co.				
McKinley	4-1	20	3 S	13 W
Wilmington				
Royalty Service Corp., Ltd.				
Communtiy	1	5	5 S	13 W
Long Beach				
Hobbs Petroleum				
Bass & Goodknight	6	30	4 S	12 W
Richfield				
Bachman Petroleum Corp.				
Kelly	1	29	3 S	9 W
Monterey County				
Amil A. Anderson				
Hillman	1	15	24 S	14 E
Santa Maria Valley				
A. N. Macrate				
Fernandez	1	26	10 N	34 W
Elwood				
Signal Oil and Gas Co.				
Appleford	9	16	4 N	29 W
Midway				
C. C. M. O. Co.	25	21	32 S	23 E
Kern County				
Trans Line Petroleum Corp.	1	3	10 N	23 W
Ten Section				
Shell Oil Co.				
K. C. L.	A34-29	29	30 S	26 E
Kern River				
General Petroleum Corp.				
Young	42	14	28 S	27 E
Edison				
Berry Holding Co.				
Grayson	4	10	30 S	29 E
DEEPEN OR REDRILL				
Long Beach				
Davis Investment Co.	16	29	4 S	12 W
U. S. Royalty Oil Corp.	1	19	4 S	12 W
Bernal Oil Co.	1	19	4 S	12 W
Oceanview Oil Corp.				
Wickstram	1	24	4 S	13 W
Huntington Beach				
Ensign Oil Co., Inc.	10	2	6 S	11 W
Torrance				
Seaboard Royalty Co., Ltd.				
Clark	1	6	4 S	14 W
Dominguez				
Union Oil Co.				
Hellman	42	33	3 S	13 W
Santa Maria				
Rice Ranch Oil Co.	12	19	9 N	33 W
Brookshire	4	23	9 N	34 W
Sunset				
R. and W. Co.				
Francis	3	6	11 N	23 W
Midway				
Quality Oil Co.				
W. P.	3	27	32 S	23 E
Associated Oil Co.	96	34	31 S	23 E
Mountain View				
Shell Oil Co.				
Porter Two	5	32	30 S	29 E
ABANDON				
Simi				
Dawson Oil Co.	1	5	2 N	17 W
Coalinga				
Pantheon Oil Co.	53 and 61	32	19 S	15 E

■ ■ ■

Stowell Opens Negotiations

Ben T. Stowell, who has blocked up 1500 acres, has begun negotiations for a deep drilling test on his property in sec. 28, 28-22, in the Belridge Canal district, with the expectation of uncovering the Miocene or the Wagonwheel formation between 8000 and 9000 ft. Stowell's acreage is surrounded by holdings of Standard, Shell and Associated.

Honolulu Oil Starts Active Wildcatting, Drilling Program; Enters L. A. Basin

HONOLULU OIL Corp. is breaking more into the limelight. Evidence points to the intention of increased activity during the next few months. Having just completed a big drilling campaign in Round Mountain, Honolulu has started another on the Kern River Front, is drilling a wildcat in a prospective extension of the South Mountain field at Santa Paula, pushing its operations in the eastern extension of Buena Vista Hills, and has entered the Los Angeles Basin in two prospective areas.

Derrick Up at Puente

Honolulu has the derrick up for its first well on part of a 245-acre lease on the Rowland ranch some three miles southeast of the town of Puente. The location is 300 ft. south and 300 ft. west of the center line of Roland and Bonita Streets, and in the ne¼ne¼ sec. 15, 2-10, within a quarter mile west of the Rio Hondo and Vega wildcats drilled about eight years ago. The Rio Hondo went to 4000 ft., the Vega to about 2100, and both had oil of 15 gravity around 2000 ft., and the deeper of the two had good showings at the bottom.

C. R. Butler of Long Beach, a former superintendent for Shell, and now president of the Dearborn Oil Co., so in the limelight at Torrance, acquired both these wells some months ago and has been endeavoring to restore them to production. While continuing work at the Vega well, Mr. Butler has taken the contract to drill the Honolulu's first well, located on land on whch he holds the original lease. He has finished skidding a rig he erected some months ago with the intention of drilling a deep test for himself. Rigging up was started over the week end and the well should be spudded in by next week if no unexpected delays occur.

Three wells have been drilled on the Roland ranch southeast of Puente, the first two being the Rio Hondo and the Vega set forth above, the third one drilled by R. W. Edens and the Hershfeld interests at a point southwest of the first two. Death of the principal backer forced the abandonment of the project although Mr. Edens declared it looked quite encouraging.

Montebello City

Honolulu is also starting core drilling in the effort to locate a new structure to the south of the old Montebello field and south of Whittier Blvd., within the city of Montebello. The first hole will be drilled in lot 72, El Carmel tract, and in the se¼nw¼ sec. 14, 2-12. The location is in an area where quite a number of wells were drilled over a period of from six to ten years ago, some of them to below 5500 ft. without commercial success, although most of them had highly encouraging showings at one time or another during the drilling. Oakridge, a subsidiary of Calpet, now The Texas Co., even erected tankage for the oil expected from a test, but there proved to be no commercial production. However, deeper drilling with more recent methods may result differently.

Honolulu is not a strager in the Los Angeles Basin wildcat areas, having drilled several wildcats in Orange county some seven years ago.

Honolulu in West Texas

Honolulu has been established and very active in West Texas for several years. Headquarters have been maintained at Midland and the company has met with marked success and has led in the discovery of four Permian Basin pools. However, no attempt has been made to produce commercially, the company evidently being deterined to hold these areas in reserve.

Honolulu Always Wildcatter

Honolulu has always been a persistent wildcat operator. Its original move was the drilling of the discovery well of the Buena Vista Hills section of Midway. Its location was some 10 miles from production and was generally looked upon as the "limit" in 1910 when it was started. The result, however, was the discovery of a new field.

■ ■ ■

Mullaney 2 Coring At 5200 Ft.

Wood-Callahan's Mullaney No. 2 at Mountain View is coring ahead at 5200 ft. in the Chanac with some showings of oil and gas. The hole will be taken down to 5400 ft. for a production test. After completing this well, the crew will move over to the 40-acre Wells lease and start drilling Wells No. 3. Drilling rights on this parcel were recently acquired from E. G. Starr.

Torrance Lease Taken

C. D. Cather has leased three acres at Torrance, under a contract which calls for the first drilling to be started within 45 days. The location is about one-half mile west of the Dearborn producer.

■ ■ ■

Formation Testing Booklet

M. O. Johnston Oilfield Service Corp., has issued a comprehensive treatise which recommends practices—gives the various types of testing—detailed information on uses and operation of testing tools, etc. Copies are available from the manufacturer.

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Seaboard Oil Starts Wildcat Well On East Side Of San Joaquin Valley

SEABOARD OIL CO., discoverer of oil on Kettleman North Dome and of the Buttonwillow gas field, is going after another possible new discovery in the San Joaquin Valley, this time on the east side of the valley. The play appears to be for either gas or oil with gas perhaps the better prospect. The location is in direct line with a series of widely separated projects drilled during the last 10 years. Seaboard will be the first established company with practically unlimited financial resources to enter the district.

Seaboard's first well will be drilled 330 ft. south and west of the center of sec. 16, 23-26, Tulare county, five miles southeast of Prixley nine miles southwest of Porterville, and five miles northwest of Ducor. One and a half miles northwest of this site, a wildcat was drilled on the nw¼nw¼ sec. 8, 23-26. It was originally started by Bruce Frame and carried down to 4773 ft. by a Los Angeles syndicate headed by P. H. Osborne, formerly with Union Oil. It encountered heavy gas at several points and there was plenty of encouragement for oil. When lack of finances halted operations, Mr. Osborne told the writer that he was perfectly sure that somebody would get a commercial well there.

Four miles due southeast of Seaboard's location, the Ducor Drilling Syndicate, headed by a Mr. Hinckle, drilled to 4331 ft. in the face of every financial and mechanical difficulty. Mr. Hinckle frequently told the writer of his firm belief that oil would be obtained provided only that he could keep on and go deep enough. At one time the showings were sufficient to cause some interest and to start a small leasing movement around the well. Still further southeast, a number of tests have been drilled to shallow depths by several small companies.

Gas To Northwest

Ten miles northwest of and in direct line with Seaboard's location, the Federal Exploration Co., financed in Hollywood, drilled its Kinsella No. 1 at the southeast corner of sec. 15, 22s-24e to 5761 ft. It encountered two or three big flows of gas and at one time there were fears of a disastrous blowout. A Christmas tree and blowout preventer were installed and heavy mud used in large quantities. However, the oil showings were comparatively slight and the well failed commercially, perhaps because of the inability of the company to stand the cost of going deeper.

Nine miles northwest of the Kinsella well and 19 miles from Seaboard's location, the Kings-Tulare County Oil Co. started a wildcat well at the northwest corner of sec. 19, 21s-22e, two miles east of the city of Corcoran, and one mile east of the Tulare county-Kings county line. It was taken and carried down to 5785 ft. by one Geo. K. Palmer, a wealthy man said to have been a newcomer in oil.

Like the other wells, this test failed commercially although it had large quantities of gas and some traces of oil. When it was down about 5000 ft., showings were encouraging, and perhaps deeper drilling would have found something. These operations started a small leasing campaign within the city limits of and around Corcoran.

Whether there is any connection between these widely separated wells it is impossible to say, but the total distance between them northwest and southeast, is no greater than the length of the Midway-Sunset fields.

Geological Theory

The line along which wells have been drilled from northwest to southeast passes to the east and northeast of old Lake Tulare. The findings in these old wells, as well as the gas wells of Dudley Ridge to the west of the now dry lake, gives rise to the theory of a connection between the location of the lake and gas and oil.

Why did Lake Tulare come to be located where it was? Because there was the low area to which the several streams that once fed it quite naturally flowed from the higher surrounding lands. Oil is found at the higher levels, not in the sinks, in the anticlines, not the synclines, and here the syncline is in the lake bed. The higher areas, Dudley Ridge on the west, and the land around what was once the eastern shore of the lake, and the land to the east, have been the scenes of the gas discoveries which encouraged the belief that commercial oil and gas may be developed there. In the lake bed no such discoveries have been made although a limited quantity of gas may be found near the edges, and marsh gas may be discovered nearer the center if sought there by the drill.

On the other hand, an objection may be found to this theory on the ground that structural highs below the surface may not be indicated by the rise or depression of the surface. Anticlines are found under the ocean.

Whether the theory is taken seriously by geologists cannot be stated here. However it is interesting to note that some in the oil industry believe in it.

Increase of U. S. G. S. Staffs Forecasts Increased Drilling Activities

INCREASE of the force at the Taft office of the U. S. Geological Survey which looks after all operations on federal leased oil lands is interpreted generally as indicating that official Washington looks for increased drilling and production during the next year. The Taft office has charge of operations in California, Nevada, and most of Arizona, and would have the care of any federal lands that may be drilled in parts of Oregon and Washington.

There are extensive operations on public lands in Kern, Fresno and Ventura counties, and some probably in one or two other counties, although the bulk of California operations, exclusive of Kettleman Hills, is on patented land. Kettleman North Dome is the biggest center of development on Federal lands in the country.

But for the dissatisfaction over the regulations promulgated by Secretary Ickes under the O'Mahoney-Greever law and with the law itself, California might have witnessed substantial revival of efforts to get oil in new Federal land areas this year. As it is, operations on such lands lag here as in the Rocky Mountains where are located the greatest area of federal owned oil lands.

Imperial Valley may be a case in point. A few years ago several large areas were covered with prospecting permits in the names of groups of employees of several large oil companies. All concerned denied that they were company ventures. There were reported to have been some extensive geophysical surveys made in the same area for unidentified interests. Other permits were acquired and presumably are still held by various individuals.

Nothing, however, has been done towards their development. There is some reason to believe that, if Secretary Ickes will revise the regulations or if Congress will modify the O'Mahoney-Greever act, there will be some activity north of Dixieland and south of the Salton Sea.

Seepage Found in Mexico?

Last year there was an unverified, but also uncontradicted report that an oil seepage had been found just across the Mexican line south of Dixieland. Failure to find seepages has always been cited as a strong argument against the chances of finding oil in Imperial Valley, despite the finding by geologists of what some of them look upon as favorable structures, and the discovery of substantial quantities of gas in the Brawley and Diamond Bar wells a few miles south of the Salton Sea and in a wildcat drilled north of Dixieland. Foremost among geologists who had confidence in the future of Imperial Valley as a gas field with good chances for oil in the Salton Sea area was the late Dr. E. A. Starke, formerly chief geologist of the Standard Oil Co. of California.

Congress May Act Upon Law

When Congress meets next month, there will almost certainly be some efforts made to modify the present law. Although fathered by a Senator and Representative from Wyoming, one of the foremost federal oil land states, it has been repudiated on all sides in their constituencies.

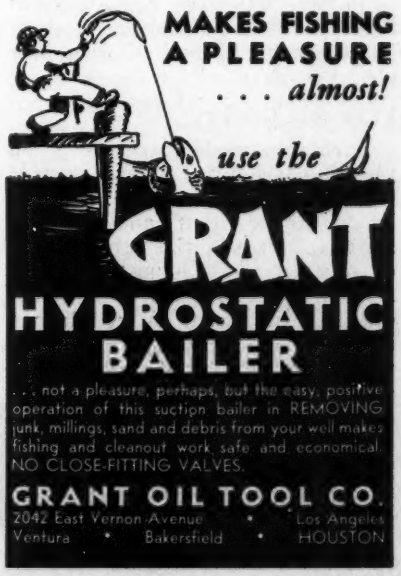
To what extent sentiment has gone in the direction of opposition to federal control of oil lands is shown by the fact that there is a movement underway in the Rocky Mountains, the extent of which it is impossible to determine at this time, looking to the return to the former system under which a patent to the surface gave the land owner absolute title to the subsoil. Several Senators and Representatives from the Rocky Mountain states have declared for such action.

Undoubtedly such a move, once well underway, would receive both support and opposition within the ranks of the oil industry in California and elsewhere. However, just now its chances for success appear to be rather remote. Opposition may be expected if the government grip on production should be weakened, as it probably would be if it held no further control over the subsoil after the patenting of the surface. Openly or otherwise, Texas might reasonably be expected to oppose such legislation. Texas is the one state that owns every acre of public lands within its boundaries and is absolutely immune from any legislation on this subject which Congress may enact. Thus strict control from Washington over a part of the oil industry in other states might be advantageous to Texas.

Department of Conservation

Secretary Ickes' attitude towards any legislation to give surface patentees title to oil and gas should be easy to forecast from his past record. However, he has just given further evidence of his stand in his annual report to Congress in which he recommends that the title of his department be changed to "Department of Conservation." He has taken the position of leader of the forces that desire extreme restrictions on development of natural resources on the ground that they will be needed sometime in the distant future. This position was held for many years by Gifford Pinchot, the father of this theory. Mr. Pinchot's present attitude towards his child has not been publicly expressed for quite a number of years, and one may well wonder if he still believes in the theory of conservation as strongly as he once did. At the same time there is unquestionably a strong sentiment today in favor of a certain amount of restriction upon over-production by state action, which is endorsed by a large part of the industry.

Five new men have been added to the force at Taft, viz.: Stanley W. R. Thompson, Glenn W. Black, Merritt B. Smith, J. H. Hassheider, and Glenn Woodward. H. B. Barton, deputy sppervisor, and J. B. Mitchell, petroleum engineer, who have been in Washington working on unit plans since August, have also returned to duty at Taft. A new stenographer, Margaret F. Nelson, has also come from Washington.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California Money To Finance Deep New Mexico Wildcatting In 1937

NEW MEXICO MAY get several deep tests of new areas during 1937. While there have been tests drilled to below 6000 ft. in the extreme northwest corner of the state and in several other parts, a great deal of the wildcat drilling scattered over a large part of the central portion of the state has been comparatively shallow. California money will finance several of these ventures.

Shell Petroleum is starting a wildcat in the se¼ne¼ sec. 24, 20s-35e, lying in the center of a triangle between Monument and Eunice fields southeast of Hobbs, Lea county. Californians have holdings in both these fields. Shell's success would establish a direct connection between the two.

Dr. W. C. Barham, consulting geologist, has returned to Los Angeles from London and has announced plans for drilling a deep test in Chaves county, west of the Artesia and Maljammar fields. He has incorporated the Excelsior Oil Products Co., has laid out a townsite called Petrolia, adjoining where he expects to drill, and has opened a campaign to finance the venture through the sale of lots and 40-acre leases, impounding the money for drilling a well. His operations will be on New Mexico state lands. Another project, the Coronado Oil Co. is held up by the need for getting better leasing terms on federal lands. This last company was formed in New Mexico by F. R. Warn of Santa Fe but a substantial block of its stock is held by California people.

Favorable Geology

Favorable geological reports on the oil possibilities of this part of Chaves county have been rendered by Alexander Grant and by Dr. Barham. Possibilities are believed to exist for deep production at several levels not penetrated by the drill in this district. A well-defined anticline is noted as extending northwest and southeast, where such drilling as has been done to date is looked upon as encouraging. All drilling in the Artesia and Maljammar district immediately to the east has been shallow, none going below 3000 ft. and most of it to lesser depths. Good production was found at these levels and there all drilling stopped. It is the belief of those who plan deep prospecting that by going 5000 ft. or more, much bigger wells will be obtained, and the older drilling has merely scratched the surface.

J. N. Wills of Roswell, N. M., geologist with a company of the one-time Standard Oil has started another deep prospecting movement by the assembling of a block of 15,000 acres in twps. 11 anad 12s-18e, Lincoln county. Here is located what is designated on the latest map issued by the New Mexico School of Mines as the Picacho Anticline, located about 30 miles west of Roswell. Except for an abandoned well with showings of gas, depth unstated, shown on the above map, the structure is untested by the drill. The nearest oil field is the Artesia-Maljammar, 30 miles to the southeast by east and south of Roswell. No oil has been found in the state to the west, due south or north.

Picacho anticline lies northeast of the Sacramento Valley and due east of the Sierra Blanca. West of these points, until a much more northern point has been reached, no oil has been found although a number of shallow dry holes, and one 3224 ft. deep in the southeast of twp. 23s-5e with a showing of gas and oil, are shown on the new map as located in the southern part of the Tularosa Basin which lies between the Sacramento Mountains and Sierra Blanca on the east and the San Andreas and the Organ Mountains on the west. The Estancia Valley, Torrance county, where a substantial production of carbon dioxide gas has been found and dry ice is being manufactured, lies practically due north.

Northwest New Mexico

Beginning in the immediate vicinity of Las Lunas and extending to the extreme northwest corner of New Mexico and into southwestern Colorado, southeastern Utah, and northeastern Arizona, there is found a series of prospective fields, some discovered to the point of production of small non-commercial quantities of oil and gas, others undrilled but with considerable geological evidence of the possibility of oil.

At Dailes, some 12 miles southwest of Las Lunas, Old Spanish Grants has a well bottomed at 6001 ft. with a good body of oil sand and good showings of oil and gas, which was halted just at the moment of a production test by mechanical accidents which junked the hole. Work is to be resumed here soon, either to clean and complete the test or to drill a new one. This enterprise has been financed in California, has headquarters in Los Angeles, and the new work will be done by a California company.

About eight miles southwest of the Old Spanish Grants well and about six miles due south of the town of Las Lunas, another well was drilled to 6474 ft. some years ago by a company financed in the mid-west. It is shown on the official state map as having had oil and gas. Immediately northwest of this well another was drilled to 4021 ft. and is also shown on the map as having had oil and gas showings. The same is true of other wells in this immediate area drilled to 2900, 1200, and 2144 ft. respectively.

Further northwest in McKinley and San Juan counties there are several small shallow fields, partly developed, and the Rattlesnake Dome in the northwest corner.

Southwest New Mexico

At present, southwestern New Mexico—the counties of Socorro, Catron, Grant, Hidalgo, Sierra, Luna, Dona Ana, and Otero—show the least evidence of oil. They have had almost none but the shallowest drilling by small companies. However the official map shows an abandoned 2860-ft. well about five miles northwest of Deming, as having had oil and gas showings, and another about the center of twp. 21s-10w, about 12 miles northwest of Deming, drilled by a Los Angeles company to 6171 ft. This last also is listed as having had oil and gas showings. During the drilling, the company's Los Angeles office was always quite sanguine over their findings. When work stopped after some six years' effort about the begining of the depression, the cause was given as financial.

South and southeast of Deming, wells drilled to 3800 and 3365 respectively quit with no oil or gas, according to the official map.

■ ■ ■

Arthur L. Campbell has returned to the oil supply game and is again with his brother in the J. A. Campbell Co. at Signal Hill. During the depression Mr. Campbell returned to his old work of teaching and was a professor of English, Latin and French. The two lines of work seem far apart but Mr. Campbell seems to make good at both.

Activity At Santa Maria Continues; 15 Strings Of Tools Now Running

RECENT ACTIVITY at Santa Maria, started by Union Oil Co. and A. N. Macrate, is continuing, with 15 wells in one or another stage of drilling.

Union Oil Co. has six wells in the area, including Adam No. 2 and Mahoney No. 2, both on sec. 24, 10-34 with the rigs up. On sec. 26, 9-34, Union has a location for Squires No. 17, with Squires No. 11 redrilling at 3294, No. 12 idle at 3558 ft., and No. 16 in shale and oil sand at 3588 ft. Vincent No. 1, on sec. 25, 10-34, is in hard shale at 4110 ft.

A. N. Macrate is rigging up his Fernandez No. 1, on sec. 26, 10-34, and is pumping 160 bbls. per day from Rice No. 1, on sec. 23, 10-34, from 2554 ft.

The Apache Oil Co's. Carreaga No. 1, on sec. 31, 9-33, is bailing in open hole, at a plugged depth of 4360. The company has obtained an O. K. on its water shut off at 4174 ft. Carreaga No. 2 has been located on sec. 7, 9-33.

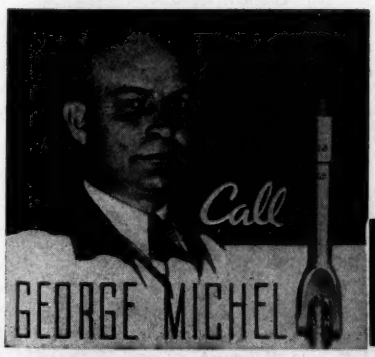
E. H. Moore, Inc., is trying to sidetrack a fish at 7650 ft., with the total depth 8020, by far the deepest in the area. The well is on sec. 25, 10-35.

The next deepest well, O. C. Field White No. 1, on sec. 21, 9-33, is idle at 5110 ft.

The Hancock - Bush California Lands No. 1, on sec. 30, 10-33, is in shale, with some oil showings, at 4945 ft., with an O. K. water shut off at 2865 ft.

W. D. Shaffer's Houk No. 1, was spudded in the first of the month, and is down 450 ft. The well is on sec. 9, 9-33.

Both the Del Petroleum Corp. and Albert Stevenson are idle in their wells, after having spudded in. Both wells are on sec. 23, 10-34.



Echo Oil Corp. is in oil shale at 2962 ft., the well having topped the Monterey at 2925 ft. The well is also on sec. 23, 10-34.

Other Coast Wildcats

A. A. Anderson has erected a rig on sec. 15, 24-14, Monterey county. The well will be known as Hillman No. 1.

In the same county, Shell is fishing for drill pipe at 5125 ft., on sec. 34, 24-10, in its Branch No. 2.

The Texas Co. is rigging up its Dunphy No. 1 in sec. 30, 19-17.

101 Oil Co. is cleaning out its Hollister No. 1, on sec. 35, 5-33, in the Point Concepcion area. The well is down less than 300 ft.

■ ■ ■

Hillman-Long Start Mountain View Wildcat

HILLMAN & LONG, Inc., has undertaken to test the possibilities of a new area lying more than a mile east of and separated from Mountain View production by a number of dry holes. Location is being graded for a test, Whittekin No. 1, on the n½sw¼ sec. 34, 30-29, 1½ miles northeast of Mohawk's Earl Fruit No. 1. Section 33, immediately to the west of the location, has been proved barren on its west side by the Ohio Oil Co's. Derby wells. The theory apparently is that a third structure here parallels Mountain View on the east and projects between it and Edison.

Hillman & Long are persistent wildcat drillers and last year drilled two, one seeking a possible extension of Dominguez, another on a structure at Westminister northeast of Huntington Beach. The present venture has no connection with either Mountain View or Edison.

■ ■ ■

Santa Fe Test At 7425 Ft.

The Union Oil Co's. Bell No. 100, a deep test at Santa Fe Springs, is down 7425 ft., and is reaming to set casing.

Pacific Western Wins Kettleman Land Suit

A CASE WHICH has been hanging fire for three years was settled last month when the United States Supreme Court affirmed the decision of the ninth circuit court of appeals dismissing the suit of Jean Bordieu of Coalinga, against the Pacific Western Oil Co., Kettleman Oil Corp., and others.

In 1908, following a geological report by Ralph Arnold and Anderson, and acting upon the recommendation of George Otis Smith of the United States Geological Survey, the Department of the Interior withdrew certain land in California for mineral purposes. In 1919, Jean Bordieu applied for the surface patents to this land, which included the n½, sec. 30, 21s-17e, which is now part of Kettleman North Dome.

Mr. Bordieu contended that this acreage had been incorrectly withdrawn by the government, and that he still retained the preferential right to prospect for minerals under the Leasing Act. The case turned on whether the land had been withdrawn correctly, and the Supreme Court decision affirmed the decision of the lower court in dismissing the case.

■ ■ ■

Equitable Cores Oil Sand

Equitable Petroleum Co. cored the 30 ft. of oil sand in its wildcat well at Hawes over the week-end but the results of the analysis are not yet available. However, Capt. C. P. Wilson, president of the company, who came to Los Angeles Sunday night, states that after coring, the drill was started at 3033, the bottom of the hole, and at 3037 broke from the hard shale into a soft brown shale. Oil immediately came up until the ditch was covered, Capt. Williams reported.

■ ■ ■

East Coyote Wells Planned

Oil Conservation, Ltd., is planning two more wells in East Coyote. J. W. Miller, manager of the company, is also organizing a company to drill at El Segundo.

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Ideco Announces New Executive Personnel

L. R. Wells

INTERNATIONAL Derrick & Equipment Co. of Calfiornia last week announced the promotion of new officers to head the organization.

L. R. Wells, formerly vice-president, was made president. The secretary of the company, J. D. McEwen, was appointed vice-president and Erle G. Meeks, assistant treasurer, became secretary-treasurer. R. C. Young was appointed assistant secretary.

L. J. Brown, president of the parent company, with headquarters in Columbus, Ohio, is chairman of the board. The other two directors are L. R. Wells and J. D. McEwen, who was elected to the board to replace C. G. Runkle, recently resigned.

J. D. McEwen

Consolidated Offer For Richfield Oil Accepted

FIVE YEARS of attempted reorganization of the Richfield and Pan-American properties culminated in the statement, made from the bench by Judge James last week, that he will approve the reorganization plan submitted by Harry F. Sinclair's Consolidated Oil Corp., with certain modifications.

Formal approval of the plan was to be made on Tuesday of this week, following the presentation of additional testimony to justify full expenses of the reorganization committee. Judge James allowed $160,426.15 of the $381,495 asked, leaving a balance of $221,068.85 which has not yet been approved.

According to the reorganization plan, the members of the proposed board of directors are as follows:

Harry F. Sinclair, chairman of the board, Consolidated Oil Corp.; George MacDonald, director, Consolidated Oil Corp. and director, Cities Service Co.; P. H. O'Neil, director, Petroleum Corp. of America; W. Alton Jones, vice-president, Cities Service Co.; Charles S. Jones, president, Rio Grande Oil Co.; F. R. Coates, president, Cities Service Co.; Fred Bartlett, retired; G. Parker Toms, chairman, Richfield reorganization committee; H. R. Gallagher, president, Consolidated Oil Corp.; and William C. McDuffie, trustee, Richfield Oil Co.

An eleventh director, to represent creditors and bondholders of the old Richfield Oil Co., will also be appointed to the board.

It was agreed that directors' meetings, other than emergency meetings, will be held in Los Angeles.

■ ■ ■

Clearwater Wildcat Underway

The Vortex Oil Co. is building a derrick for a wildcat at Clearwater. The location is north of Compton Blvd. on Michigan Ave.

■ ■ ■

J. C. Axelson, president of the Axelson Manufacturing Co., has announced the appointment of Norbert Winter as Roumania factory representative, effective Oct. 1. Mr. Winter will make his headquarters at Bucharest after spending three months at the Axelson factory in Los Angeles. His work will involve both sales and service on all products sold by the Axelson Manufacturing Co. in foreign areas. The principal portion of this business is confined to deep well plunger pumps and sucker rods.

R. S. Oiler, In Game For Forty Years, Dies

FORTY YEARS of activity in the petroleum industry were ended last Sunday night when Robin S. Oiler, driller and operator, passed away at his home in Pasadena at the age of 61.

Mr. Oiler was connected with the Standard Oil Co. for 12 years, during most of which time he was stationed in the Coyote Hills. He also spent 12 years in Coalinga and at one time was superintendent for the California Oil and Gas Co.

In recent years, Mr. Oiler acquired wells on the west side of Coalinga and operated his own properties. For the last five years he has been in virtual retirement.

Mr. Oiler leaves his widow, Stella T. Oiler, and three children, Mrs. Harry Hartisan, Mrs. Dorothy Smith and Philip R. Oiler. Services were held Wednesday at 3:00 P. M., and interment was in Rosedale Cemetery.

Mysterious Conference Still A Big Mystery

NOT A WORD further has been obtained as to "the 1937 oil conservation program" and the mysterious conference supposed to have been held in Washington on Nov. 18, with two unknowns, Messrs. Ralston and Meeker, presuming to represent California. Neither has anybody yet been found who has ever known of these gentlemen.

Failing to find any solution of the mystery, it was suggested that the "conference" may possibly have been one with Secretary Ickes known to be scheduled to discuss needed modifications in the oil land leasing regulations and that Messrs. Ralston and Meeker might be federal lease holders. However, inquiry in quarters in close touch with federal leasing matters throws no light on the problem. California holders of federal land leases say they expect a conference to be held soon and they have asked for it. However, it has not been held yet so far as they have been informed and none of them ever heard of Messrs. Meeker and Ralston. And so the mystery is still unsolved. Replies received from Washington fail to tell anything more.

Review Of Kettleman Development

(Continued from Page 20)

pressure at which wells will continue to flow then we can expect an area covering approximately 2500 acres at the north end of the field to reach the critical point within the near future.

In the absence of a uniform water encroachment and a definite lag in the rate of encroachment, pressure maintenance becomes a matter of vital importance.

Effects of Pressure Reduction

Evidence has become available to show that edgewater is not encroaching fast enough to maintain pressure. This reduction in pressure is not confined solely to the competitive areas but is spreading to wells three to six miles from production.

Loss of reservoir pressure affects ultimate recovery of oil in two ways —by removing the energy necessary to move the oil to the bottom of the well and by increasing the resistance of the flow through increase in viscosity and surface tension.

Correlative Rights

Gas production at Kettleman Hills can be materially reduced. We have heard much of the correlative rights of property owners in a common pool and there is to be found no more direct application of this doctrine than in the correlative rights to the reservoir energy. Thus it should be possible to promote the most efficient and economical recovery of the maximum volume of oil and to prevent the waste of this energy through premature gas withdrawals made for the sole purpose of converting that gas into immediate cash realization. At Kettleman Hills, gas production and gas/oil ratios are optional with operators, the great majority of whom are seriously concerned with the alarming loss of pressure.

It is believed that ample engineering data are available to show that present production methods are wasteful and injurious to the field; that pressure is diminishing at an alarming rate: that water encroachment is not fast enough to maintain pressure and that if present practices are continued the ultimate recovery from the field will be less than half of what it would be if unnecessary gas production were deferred until after the oil had been produced.

Conclusions

In conclusion the authors desire to emphasize the following facts and considerations:

(1) Subsurface pressure is dropping at an alarming rate.

(2) Pressure maintenance is essential to facilitate the flow of oil to wells.

(3) Loss of pressure not only affects the motive force but results in increased viscosity and resistance to flow.

(4) Pressure loss largely due to excessive gas reduction.

(5) Low ratios are attainable.

(6) Pressure maintenance will result in higher recovery of oil.

Some operators in Kettleman submitted to unitization unwillingly or at least with considerable misgivings. It certainly has been no disadvantage to the so-called outsiders. Unless a field is subject 100% to a unified policy of development and production there is no unit operation. At best it is a "cooperative operation" with loose ends varying in importance from slight annoyance to complete domination.

Unfortunately, these conditions have resulted from factors beyond the control of the Association and its Board of Directors. These evils have been continued in spite of repeated protests on the part of Directors, and members who have endeavored to support the original purposes of the Unit Plan.

Practically, the authors believe that unit operation is not the complete answer to proper oil field development and production. So much has been said about the "rule of capture" that no attempt will be made here to discuss it in detail. Let it suffice to say that the "rule of capture" is not a law. It is, as expressed by a legal friend, a shield rather than a sword. Unfortunately it is used as the shield of greed; the antithesis of cooperative effort. When it is finally recognized that the energy of a pool as well as its valuable contents are the common property of all and that no single individual may so use his property as to injure his neighbor, then, perhaps, relief may be found in the courts for such a situation as we have herein shown to exist.

■ ■ ■

Joseph Olson is again at home in Los Angeles after having been at Oklahoma City where wells were obtained on leases held and for a time it looked as if a great fortune were within his grasp. However, water broke into the wells.

Depletion Allowance

(Continued from Page 11)

eral, state or local, is to get the fullest information in regard to the reasons why such taxes either should not be levied at all, or why they should be less heavy than proposed, together with honest and clear presentations of the effect of these taxes upon an industry and upon the public whom it serves, and then frankly to present these, with such supplemental information as might be obtainable, to those bodies which may be considering such taxes. It is hard to believe that there is anywhere in this country any responsible authorities, in our representative form of government, who desire to levy punitive or oppressive taxes upon any legitimate form of industry.

"The power to tax is the power to destroy." But no governmental authority desires to destroy those agencies in our economic life which are contributing to our prosperity. On the other hand, governmental bodies require revenues. Revenues must be derived from taxes. Taxes must be paid by somebody. We must expect to bear our proper share of them. If the amount allotted to us is improper, or if the mode of the levy is inequitable, then I am quite sure that your public servants, your representatives in the various units of government, will be glad to hear you sympathetically. The very fact of this depletion tax, so important to everyone in the petroleum industry, is an illustration of this fact.

■ ■ ■

Continental Sells Rights

Last week the Continental Oil Co. sold the shallow zone rights of the Pirie lease, located just south of the town of Ojai, to the St. Louis Petroleum Co. The Pirie lease, about 1188 acres in extent, is located on Lion Mountain.

Two years ago low gravity oil was discovered on this location and two wells were sunk to the 2800-ft. level, producing at the present time about 20 bbls. of oil per day. Continental sold rights to all production above the Eocene, reserving the Eocene zone and everything below because of a Continental wildcat now drilling in the hills four miles west of the Pirie lease. The wildcat, known as Casitas No. 1, is being drilled on the Hobson lease, and Continental believes that any Eocene production found in the Casitas area might be obtained from Lion Mountain as well.

California Co. Incorporated

The California Co., a subsidiary of Standard Oil of Calif., filed incorporation papers with Secretary of State Jordan on Nov. 27. The company is capitalized at $15,000,000 and directors are Hugh Fullerton, Woodson Spurlock, Renato Capocelli, A. B. Turner, Garry Owen, Charles A. Ruggles and Henry G. Hayes.

The California Co. originally incorporated in Montana has been engaged in exploration and production of oil in the Rocky Mountain region, Texas, Wyoming and other Mid-Continent fields for many years. Incorporation in California was effected to comply with certain legal requirements and will not affect the company's activities.

■ ■ ■

Eureka No. 1 Drilling At 6519

The Texas Co. is in gray sand and shale in its Eureka No. 1, sec. 22, 3n-1w, Humboldt county. The well is down 6519 ft.

■ ■ ■

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Gilmore To Drill

The Gilmore Oil Co. is preparing to start its Jaite No. 1, Wilmington. Drilling will probably be done under contract.

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Dr. W. C. Barham, Los Angeles engineer, is home from London where he has been seeking backing for his development of oil prospects in Chaves county, New Mexico, where there has been some drilling by a company in which a number of California people are interested. More development is planned as soon as Secretary Ickes can be induced to permit operations on terms that will make work possible. Dr. Barham formed a company and, in addition to drilling plans, is promoting a townsite known as Petrolia.

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